United States Department of Agriculture

Soil Conservation Service

In cooperation with the University of Georgia, College of Agriculture, Agricultural Experiment Stations

Soil Survey of Catoosa County, Georgia

How To Use This Soil Survey

General Soil Map

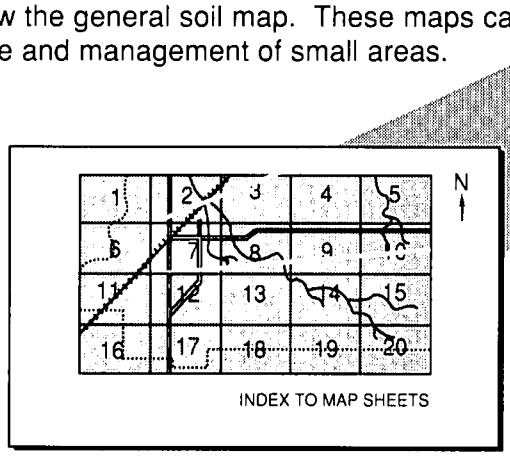
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

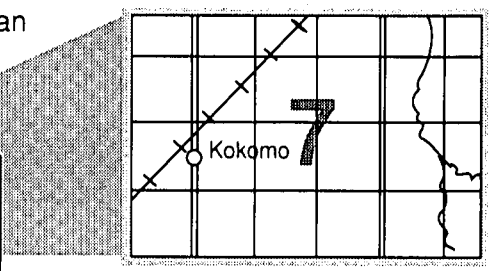
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



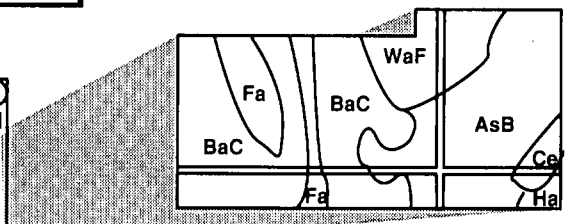
INDEX TO MAP SHEETS



MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1987. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This soil survey was made cooperatively by the Soil Conservation Service and the University of Georgia, College of Agriculture, Agricultural Experiment Stations. It is part of the technical assistance furnished to the Catoosa County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Tall fescue in an area of Rome silt loam, 2 to 6 percent slopes, used for pasture. Nella stony fine sandy loam, 25 to 45 percent slopes, very stony, is in the background.

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Foreword

This soil survey contains information that can be used in land-planning programs in Catoosa County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Hershel R. Read
State Conservationist
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Soil Survey of Catoosa County, Georgia

By Kenneth S. Lawrence, Soil Conservation Service

Fieldwork by Glenn L. Bramlett, Dan H. Jordan, Ray J. Tate, and Edward E. Looper, Soil Conservation Service

in cooperation with the
University of Georgia, College of Agriculture, Agricultural Experiment Stations

CATOOSA COUNTY is in the northwestern part of Georgia (fig. 1). It has a land area of about 162.4 square miles, or 103,900 acres. Ringgold, the county seat, is near the center of the county.

Catoosa County is in the Southern Appalachian Ridges and Valleys Major Land Resource Area. The survey area consists of a series of ridges and valleys that lie in a southwest-to-northeast direction. Taylor Ridge and White Oak Mountain are the two dominant ridges in the county.

Most of the soils in the county are on very gently sloping to steep uplands and nearly level flood plains and stream terraces. The soils in the uplands are mainly well drained and moderately well drained and have a loamy surface layer and a loamy or clayey subsoil. They are underlain by limestone, shale, or sandstone bedrock at a depth of more than 20 inches. The soils on the flood plains and stream terraces are somewhat poorly drained to well drained and are commonly flooded. They are loamy throughout, or they have a loamy surface layer and a predominantly clayey subsoil.

The first soil survey of Catoosa County was published in 1941 *(12)*. This survey updates the earlier survey and provides additional information.

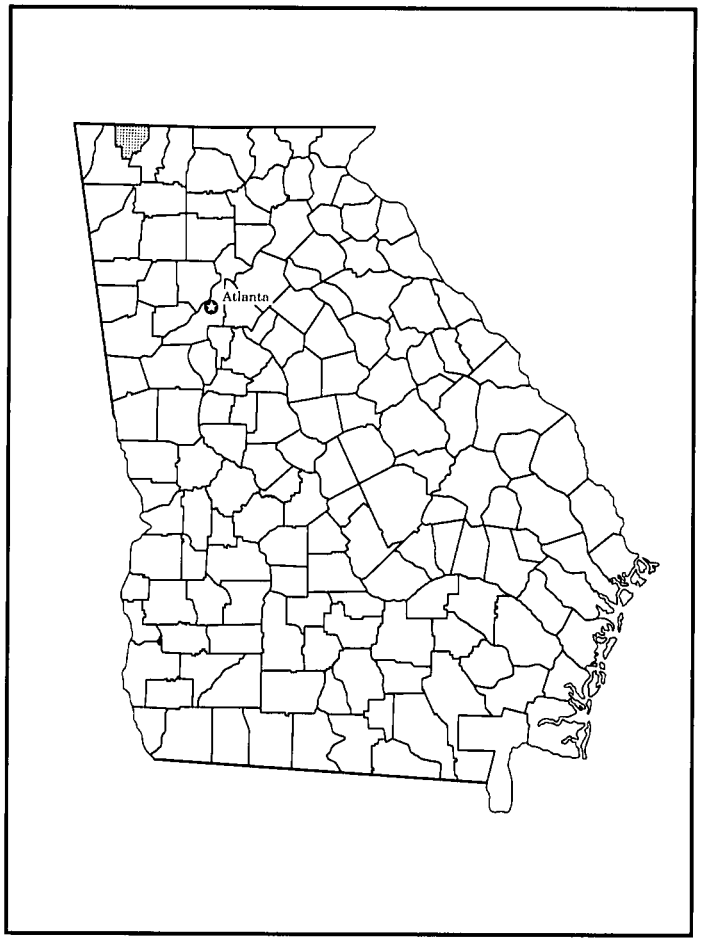

Figure 1.—Location of Catoosa County in Georgia.

General Nature of the County

This section provides general information concerning the survey area. It includes climate; geology; settlement and history; farming; water resources; physiography, relief, and drainage; and industries, utilities, and transportation facilities.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at LaFayette, Georgia, in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 41 degrees F and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at LaFayette on January 31, 1966, is -10 degrees. In summer, the average temperature is 76 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 28, 1952, is 106 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 56.44 inches. Of this, 26 inches, or about 45 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 6.36 inches at LaFayette on September 5, 1969. Thunderstorms occur on about 49 days each year.

The average seasonal snowfall is about 2 inches. The greatest snow depth at any one time during the period of record was 6 inches.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the northwest. Average windspeed is highest, 11 miles per hour, in spring.

Geology

William R. Fulmer, geologist, Soil Conservation Service, helped prepare this section.

According to the Geologic Map of Georgia, Catoosa County is in the Ridge and Valley Sedimentary Rocks part of Georgia, a part of the Appalachian Valley. The terrain is characterized by valleys separated by steep ridges. The part of the county east of White Oak Mountain and Taylor Ridge is characterized by long, discontinuous, steep-sided ridges separated by narrow valleys. West of White Oak Mountain and Taylor Ridge, the ridges are wide and rounded. Lowland areas are 700 to 800 feet above sea level. The ridges rise 100 to 300 feet above the valley floors. The most prominent topographic features in the county are White Oak Mountain and Taylor Ridge, which rise more than 1,300 feet above sea level. Catoosa County lies in the Tennessee River basin and is drained by South Chickamauga Creek, which flows northward and joins the Tennessee River about 4 miles north of Chattanooga, Tennessee.

The kinds of parent material in which the soils in the county formed were weathered from Paleozoic sedimentary rocks laid down between the Early Cambrian and the Pennsylvanian periods. The sediments of the Lower Cambrian through the Lower Ordovician period were washed from land areas to the northwest and deposited on the floor of a shallow sea. Sediments of the Middle Ordovician through the Pennsylvanian periods were derived from land areas to the southeast or east. The geologic formations underlying Catoosa County were flat until compressional forces from the southeast deformed them into giant folds. The rocks of the county west of Sand Mountain are included in a large wave-like fold that brought the rocks up across an axis in Peavine Valley and down beneath the Chickamauga Valley and up again to form Missionary Ridge. Faulting broke and distorted the fold somewhat at Boynton Ridge and western Peavine Valley. East of Sand Mountain, older rocks were thrust over and now overlie younger rocks. Other faults brought younger rocks into contact with older rocks, which resulted in distortion and realignment of formations.

The Rome Formation of the Early Cambrian period underlies much of the eastern part of the county. This formation consists mostly of sandstone, siltstone, and claystone. Soils that formed in claystone and siltstone develop variable colors in shades of red, brown, and green as a result of weathering. Soils that formed in sandstone develop colors ranging from green to white. Cunningham and Townley soils are common on the ridges and the lower slopes in this formation. Water yields in the sandstone and shale aquifer in the Rome Formation are generally low; they average 3 to 5 gallons per minute and are 20 gallons per minute at the most.

The Chickamauga Limestone, of the Ordovician period, underlies Rabbit Valley, an area east of Ringgold, and the Chickamauga Valley, along the

western edge of the county. Lyerly and Talbott soils are on relatively low valley slopes and are typical of soils that formed in material derived from this formation. Wells in the Chickamauga Limestone Formation can yield as much as 50 gallons of water per minute, but wells drilled in limestone along the steeper slopes can have poor yields. Sulfur water is common in this formation.

Peavine Ridge, immediately west of Ringgold, and Boynton Ridge, farther west along the Chickamauga Valley, represent the Knox Group, which is from the Cambrian and Early Ordovician periods. A small section of the Knox Group crops out along the eastern edge of the county. The limestone and dolomite of the Knox Group contain extensive chert bedding, and weathering of these materials produces numerous gray or white nodules, cobbles, and boulders within the soil matrix. Soils that formed in material weathered from the Knox Group have numerous chert fragments in the surface layer. Fullerton and Minvale soils are examples.

The Conasauga Group of the Cambrian period underlies Peavine Valley and consists of limestone and shale. Peavine Valley, which is characterized by numerous sinkholes and solution openings, is the largest area underlain by the Conasauga Group. Several large caves are features of the western slope of Peavine Ridge. Lyerly and Talbott soils are common in areas where this formation occurs. Water yields range from 5 to more than 20 gallons per minute in the limestone areas; they are lower in the shale areas.

White Oak Mountain and Taylor Ridge constitute the most prominent elevated feature running through the county from north to south. They are immediately east of Ringgold. The Red Mountain Formation underlies this ridge area. It consists essentially of sandstone and shale but has a few beds of limestone and fossil iron ore. As the degree of weathering progresses in areas of this formation, the developing soils vary from shades of gray to various shades of brown. The soils on the steep ridges are not deep, and they have a high content of coarse fragments. Nella and Tidings soils are examples. The Red Mountain Formation has steep slopes and thus is generally a very poor aquifer. It produces only moderate amounts of water that has a very high content of iron.

Other formations of lesser extent also crop out within the county. They consist of shales, limestones, and sandstone.

Settlement and History

Catoosa County was established by an act of the General Assembly of Georgia in 1853. It was created from Walker and Whitfield Counties and named for Catoosa Springs, which are several miles east of Ringgold. Ringgold, the county seat, was named for Samuel Ringgold, a major in the Army.

The survey area was originally inhabited by Cherokee Indians, but a treaty signed in 1835 allowed the state to take control of lands formerly held by the Cherokee tribe. In 1838, the Cherokee people left the area.

In 1863, a fierce Civil War battle took place in and around Ringgold. The Chickamauga-Chattanooga National Military Park, the oldest and largest military park in the country, was later created in an area south of Fort Oglethorpe.

Cotton, corn, small grain, and other field crops were grown by the early settlers. Peaches were also grown, and woodland was an important land use. In recent years, however, much of the land has been converted to pasture. Poultry, dairy cattle, and other livestock operations are also important.

Farming

Samuel B. Ward, district conservationist, Soil Conservation Service, helped prepare this section.

When Catoosa County was first settled, most of the farms were diverse and complete within themselves. Farm size ranged from 160 to 4,000 acres. The nearest market for farm products was in Augusta, Georgia. Corn, wheat, and bacon were important agricultural products after the Civil War. During the 1880's, farm size decreased and tenant farming was common. The production of corn, wheat, and bacon declined, but the production of cotton increased. In the early 1900's, truck farming developed in the northwestern part of the county near Chattanooga. During this period, dairy and beef cattle operations became common. These operations were typically included with general farming, which continued until about 1914. Cotton production dominated the area's agriculture from 1914 until about 1950. Since the early 1950's, much of the land has been converted to pasture or to nonfarm uses.

The increased production of cotton resulted in an increased hazard of erosion and a reduction of soil fertility. The establishment of sawmills in the late 1800's led to the disappearance of nearly all the virgin forest. During the 1930's, however, farmers began to apply conservation measures, such as reforestation, cropping systems that include grasses and legumes and winter cover crops, and terraces. They also began to improve soil fertility by applying limestone and fertilizer.

The current trend in Catoosa County is toward smaller farms and part-time farmers. For example, the

county has many small cow-calf operations, which are operated mainly by part-time farmers. Dairy farms are still common. Corn is the dominant field crop, but most of the corn is grown for silage. Some soybeans and grain sorghum also are grown.

Water Resources

Surface water is the primary source of water in the county. Most of the water used in the county is drawn from Yates Spring, but some of it is drawn from the Tennessee River in Chattanooga, Tennessee. Chickamauga Creek provides water to the community of Ringgold. Fort Oglethorpe obtains part of its water from the Tennessee River and the rest from within the county.

In some areas, wells provide water for domestic and livestock use. Drilled wells are widely scattered, however, and some areas of the county have no wells. Most drilled wells are less than 100 feet deep, but some are nearly 150 feet deep. Small farm ponds throughout the county are used for the watering of livestock and for some recreational activities.

Physiography, Relief, and Drainage

Catoosa County is within the Southern Appalachian Ridges and Valleys Major Land Resource Area. The county is characterized by a series of ridges and valleys that lie in a southwest-to-northeast direction. The ridges include Boynton Ridge, Peavine Ridge, Taylor Ridge, Dicks Ridge, White Oak Mountain, Cherokee Ridge, and several lesser ridges. The valleys between the ridges are 1 to 4 miles wide.

The area to the east of Taylor Ridge and White Oak Mountain has mostly moderately steep or steep soils on the ridges and nearly level to strongly sloping soils in the narrow valleys. The area to the west of Taylor Ridge and White Oak Mountain has mostly very gently sloping to steep soils on the ridges and nearly level to strongly sloping soils in the wide valleys.

Some of the ridges rise as much as about 400 feet above the valley floors. Elevation in the county ranges from 670 feet above sea level where Chickamauga Creek leaves the county to about 1,435 feet above sea level at the top of Taylor Ridge in the southern part of the county.

Catoosa County lies within the Tennessee River basin. It is drained by several creeks and their tributaries, including Tiger Creek, East Chickamauga Creek, Little Chickamauga Creek, South Chickamauga Creek, West Chickamauga Creek, and Peavine Creek. Most of the creeks flow to the north.

Industry, Utilities, and Transportation Facilities

Manufacturing, mainly carpet and yarn, makes up most of the industry in Catoosa County. Furniture is also manufactured in the county.

Public utilities include water, electricity, natural gas, telephone, and sewage treatment systems. Ringgold and Fort Oglethorpe have sewage treatment plants. Most of the unincorporated parts of the county use septic systems for disposal of human waste.

Interstate 75 and several federal and state highways provide transportation routes through the survey area. More than 95 percent of the county's roads are paved. The county has railroad service and several truck lines.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify

predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

The descriptions, names, and delineations of soils in

this soil survey do not fully agree with those in the surveys of adjacent areas. Differences are the result of a better knowledge of soils, modifications in series concepts, and variations in the intensity of mapping or in the extent of the soils within the survey areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area differ in suitability for major land uses. In this section, each map unit is rated for the visual elements of landform, water, vegetation or land use, and structures. The units are classified as having a low, moderate, or high degree of visual diversity. This is a value rating of landscape elements and their pattern developed for local geographic areas. Visual diversity can be used in conservation planning and in establishing a desirable continuity of landscape elements. The extent of the map units and their components are identified and described. The main management concerns are identified, and the soil properties that limit use are indicated. Each map unit is rated for field crops, pasture, and woodland.

1. Chenneby-Rome

Nearly level and very gently sloping, somewhat poorly drained and well drained soils that are loamy throughout and are 60 or more inches deep over bedrock; on flood plains and stream terraces

The landscape of this map unit is characterized by nearly level and very gently sloping soils in areas that are about 0.1 to 0.75 mile wide. These soils are mainly on flood plains along the larger creeks. The somewhat poorly drained Chenneby soils extend from the middle to the outer part of the flood plains, and the well drained Rome soils are on the higher stream terraces. The slope is 0 to 6 percent. The drainage system is defined, but the soils are occasionally flooded from late fall to midspring. Most of the natural watercourses are intermittent. Areas of open water are few. The soils are used mainly for field crops, hay, or pasture. Other than roads and bridges, there are few manmade structures. The degree of visual diversity is low.

This unit makes up about 9 percent of the county. It is about 55 percent Chenneby soils, 36 percent Rome soils, and 9 percent soils of minor extent.

Chenneby soils are somewhat poorly drained. Typically, they are silt loam throughout. The surface layer is dark brown. It is about 9 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, the next part is yellowish brown and has grayish mottles, and the lower part is mainly grayish brown and has yellowish brown mottles.

Rome soils are well drained. Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown loam about 4 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part is yellowish brown clay loam that has strong brown mottles; the next part is yellowish brown clay loam that has brownish and reddish mottles; and the lower part is mottled yellowish brown, strong brown, and red sandy clay loam.

Of minor extent in this unit are Holston, Ketona, and Whitwell soils. The well drained Holston soils are on stream terraces and on foot slopes in the uplands. The poorly drained Ketona soils are on flood plains. The moderately well drained Whitwell soils are on stream terraces.

The main management concerns are flooding and wetness. Flooding is likely in most areas of this unit. Also, wetness is a limitation in areas of Chenneby soils. The suitability of the soils for field crops is limited because of the seasonal flooding and the wetness. The soils are well suited to hay and pasture, and the potential woodland productivity is high. The hazard of

flooding and the seasonal high water table severely limit the suitability of the soils for most nonfarm uses.

2. Lyerly-Talbott

Very gently sloping to strongly sloping, moderately well drained and well drained soils that have a loamy surface layer and a clayey subsoil and are 20 to 40 inches deep over limestone bedrock; on uplands

The landscape of this map unit is characterized by very gently sloping to strongly sloping soils on ridgetops and hillsides that are mostly smooth and convex. The slope is 2 to 15 percent. The areas of this unit lie in a north-south direction and are mainly west of Taylor Ridge and White Oak Mountain. Excess surface water from these soils drains into a system of mainly intermittent streams. Areas of open water are few. The soils are used mainly for hay, pasture, or woodland. Roads, utility lines, fences, and farm homes and associated structures are common. The degree of visual diversity is moderate.

This unit makes up about 26 percent of the county. It is about 45 percent Lyerly soils, 19 percent Talbott and similar soils, and 36 percent soils of minor extent.

Lyerly soils have a very high content of clay in the upper part of the subsoil. They are moderately well drained and well drained. Typically, the surface layer is brown silty clay loam about 6 inches thick. The subsoil is clay about 18 inches thick. The upper part is yellowish brown and has yellowish red mottles, and the lower part is light olive brown and has olive and pale yellow mottles. Limestone bedrock is below a depth of 24 inches.

Talbott soils have a high content of clay in the upper part of the subsoil. They are well drained. Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil is about 33 inches thick. It is predominantly red. The upper part is silty clay, and the lower part is clay. Limestone bedrock is at a depth of about 37 inches.

Of minor extent in this unit are the moderately well drained Capshaw and Conasauga soils, the well drained Dewey and Fullerton soils, and the somewhat poorly drained Tupelo soils. All of the minor soils, except for Tupelo soils, are on foot slopes or in other areas on uplands. Tupelo soils are on uplands and stream terraces.

The main management concerns are the depth to bedrock, the shrink-swell potential, and the slope. The suitability of the less sloping soils on ridgetops for most uses is limited because of the depth to bedrock and the shrink-swell potential. The more sloping soils on hillsides are additionally limited because of the slope. The potential woodland productivity is moderate.

3. Townley-Cunningham-Conasauga

Very gently sloping to moderately steep, well drained and moderately well drained soils that have a loamy surface layer and a dominantly clayey subsoil and are 20 to 60 inches deep over shale bedrock; on uplands

The landscape of this map unit is characterized by very gently sloping to moderately steep soils on ridgetops, hillsides, and foot slopes in the uplands. The slope is 1 to 25 percent. The areas of this unit lie in a north-south direction and are mainly east of Taylor Ridge and White Oak Mountain. Excess surface water from these soils drains into a system of mainly intermittent streams. Areas of open water are few. The soils are used mainly for hay, pasture, or woodland. Roads, utility lines, fences, and farm homes and associated structures are common. The degree of visual diversity is moderate.

This unit makes up about 20 percent of the county. It is about 29 percent Townley and similar soils, 21 percent Cunningham and similar soils, 7 percent Conasauga soils, and 43 percent soils of minor extent.

Townley soils are well drained. They are 20 to 40 inches deep over shale bedrock. Typically, the surface layer is light yellowish brown silt loam about 6 inches thick. The subsoil is about 21 inches thick. The upper part is yellowish brown silty clay loam, and the lower part is strong brown clay. Shale bedrock is below a depth of 27 inches.

Cunningham soils are well drained. They are 40 to 60 inches deep over shale bedrock. Typically, the surface layer is yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of 46 inches. The upper part is reddish yellow silty clay loam, the next part is yellowish red and reddish yellow silty clay, and the lower part is reddish yellow and yellowish red gravelly silty clay that has a few weathered fragments of shale. The soils have reddish yellow and yellowish red, weathered soft fragments of shale and siltstone to a depth of about 58 inches. Weathered shale bedrock is below a depth of 58 inches.

Conasauga soils are moderately well drained. They are 20 to 40 inches deep over shale bedrock. Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The next layer is about 3 inches of brown silt loam. The subsoil is about 30 inches thick. The upper part is yellowish brown silty clay loam, the next part is yellowish brown silty clay, and the lower part is brownish yellow silty clay that has brownish mottles. Weathered shale bedrock is below a depth of 36 inches.

Of minor extent in this unit are the well drained Allen, Apison, Armuchee, and Tidings soils and the somewhat poorly drained Chenneby soils. All of the minor soils, except for Chenneby soils, are on foot slopes or in other areas on uplands. Chenneby soils are on flood plains.

The main management concerns are the depth to bedrock, the shrink-swell potential, and the slope. The suitability of the less sloping soils on ridgetops and foot slopes for most uses is limited mainly because of the depth to bedrock and the shrink-swell potential. The more sloping soils on hillsides are additionally limited because of the slope. The potential woodland productivity is moderate.

4. Minvale-Fullerton

Very gently sloping to strongly sloping, well drained, gravelly soils that have a loamy surface layer and a loamy and clayey subsoil and are 60 or more inches deep over limestone bedrock; on uplands

The landscape of this map unit is characterized by very gently sloping to strongly sloping soils on ridgetops and hillsides. The slope is 2 to 15 percent. The areas of this unit lie in a north-south direction and are mainly west of Taylor Ridge. Several less extensive areas lie east of Taylor Ridge and White Oak Mountain. Excess surface water from these soils drains into a system of mainly intermittent streams. Areas of open water are few. The soils are used mainly for hay or pasture, but several areas are developed as sites for residential structures. Roads, utility lines, fences, and farm homes and associated structures are common. The degree of visual diversity is high.

This unit makes up about 22 percent of the county. It is about 51 percent Minvale and similar soils, 20 percent Fullerton and similar soils, and 29 percent soils of minor extent.

Minvale soils are loamy and gravelly throughout. Typically, the surface layer is grayish brown gravelly silt loam about 10 inches thick. The subsoil extends to a depth of 65 inches or more. It is strong brown or yellowish red gravelly silty clay loam.

Fullerton soils are gravelly throughout. They have a loamy surface layer and a predominantly clayey subsoil. Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. It is mainly red. The upper part is gravelly silty clay loam, and the lower part is gravelly clay.

Of minor extent in this unit are the well drained Allen, Decatur, Dewey, Ennis, and Talbott soils and the moderately well drained Shack and Wax soils. All of the minor soils, except for Ennis and Wax soils, are on foot slopes or in other areas on uplands. Ennis soils are on flood plains, and Wax soils are on foot slopes in the uplands and near drainageways.

The main management concern is the slope; however, the less sloping soils on ridgetops are well suited to most uses. The potential woodland productivity is moderate.

5. Townley-Tidings

Strongly sloping to steep, well drained soils that have a loamy surface layer and a dominantly clayey subsoil or gravelly soils that are loamy throughout and are 20 to 60 inches deep over shale bedrock; on uplands

The landscape of this map unit is characterized by strongly sloping to steep soils on hillsides in the uplands. The slope is 10 to 45 percent. The areas of this unit lie in a north-south direction and are east of Taylor Ridge and White Oak Mountain. Excess surface water from these soils drains into a system of mainly intermittent streams. Areas of open water are few. The soils are used mainly as woodland, but a few areas are used as pasture. There are few manmade structures. The degree of visual diversity is low.

This unit makes up about 8 percent of the county. It is about 48 percent Townley soils, 42 percent Tidings soils, and 10 percent soils of minor extent.

Townley soils have a loamy surface layer and a mainly clayey subsoil. They are 20 to 40 inches deep over bedrock. Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is about 24 inches thick. The upper part is yellowish red silty clay and clay, and the lower part is yellowish red clay that has yellowish mottles. Weathered shale bedrock is below a depth of 30 inches.

Tidings soils are loamy throughout. They are 40 to 60 inches deep over bedrock. Typically, the surface layer is dark brown gravelly loam about 2 inches thick. The subsurface layer is dark grayish brown gravelly loam about 6 inches thick. The subsoil extends to a depth of about 31 inches. The upper part is yellowish brown gravelly loam, and the lower part is yellowish brown gravelly clay loam. The substratum is yellowish brown and pale brown gravelly loam about 12 inches thick. Highly weathered shale that has interbedded sandstone and siltstone is below a depth of 43 inches.

Of minor extent in this unit are the well drained Allen, Armuchee, Cunningham, and Nauvoo soils. These soils are on foot slopes or in other areas on uplands.

The main management concerns are the depth to bedrock and the slope. The potential woodland productivity is moderate.

6. Minvale-Bodine-Fullerton

Moderately steep to very steep, well drained and somewhat excessively drained, gravelly and cobbly soils that are loamy throughout or have a loamy surface layer and a dominantly clayey subsoil and that are 60 or more inches deep over limestone bedrock; on uplands

The landscape of this map unit is characterized by moderately steep to very steep soils mainly on foot slopes and hillsides in the uplands. The slope is 15 to 60 percent. The areas of this unit lie in a north-south direction and are mainly west of Taylor Ridge and White Oak Mountain. Excess surface water from these soils drains into a system of mainly intermittent streams. Areas of open water are few. The soils are used mainly as woodland, but several areas are developed as sites for residential structures. There are few other manmade structures. The degree of visual diversity is moderate.

This unit makes up about 11 percent of the county. It is about 26 percent Minvale soils, 25 percent Bodine soils, 17 percent Fullerton soils, and 32 percent soils of minor extent.

Minvale soils are well drained and are loamy and gravelly throughout. Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer to a depth of about 14 inches is light yellowish brown gravelly silt loam. The subsoil extends to a depth of 65 inches or more. The upper part is yellowish brown gravelly silt loam, and the lower part is strong brown and yellowish red gravelly silty clay loam.

Bodine soils are somewhat excessively drained and are loamy and predominantly gravelly throughout. Stones that are about 10 to 24 inches in diameter and 10 to 70 feet apart are on the surface. Typically, the surface layer is dark grayish brown cobbly silt loam about 4 inches thick. The subsurface layer to a depth of about 12 inches is pale brown gravelly silt loam. The subsoil extends to a depth of 65 inches or more. The upper part is light yellowish brown very gravelly silt loam, the next part is yellowish brown very gravelly silty clay loam, and the lower part is strong brown very gravelly silty clay loam.

Fullerton soils are well drained. They are gravelly throughout and have a loamy surface layer and a clayey subsoil. Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. It is mainly gravelly clay. The upper part is strong brown, the next part is red, and the lower part is red and yellowish red and has yellowish mottles.

Of minor extent in this unit are the well drained Decatur, Dewey, and Ennis soils and the moderately well drained Shack soils. Decatur, Dewey, and Shack soils are in landscape positions similar to those of the Bodine and Fullerton soils. Ennis soils are on flood plains.

The main management concern is the slope. The potential woodland productivity is moderate.

7. Tidings-Nella

Steep and very steep, well drained, gravelly and stony soils that are loamy throughout and are 40 to more than 60 inches deep over shale or sandstone bedrock; on uplands

The landscape of this map unit is characterized by steep and very steep soils on foot slopes and hillsides in the uplands. The slope is 25 to 70 percent. The areas of this unit lie in a north-south direction on Taylor Ridge and White Oak Mountain. Excess surface water drains into a system of mainly intermittent streams. Areas of open water are few. The soils are used mainly as woodland. There are few manmade structures. The degree of visual diversity is low.

This unit makes up about 4 percent of the county. It is about 38 percent Tidings and similar soils, 36 percent Nella and similar soils, and 26 percent soils of minor extent.

Tidings soils are gravelly throughout. They are 40 to 60 inches deep over bedrock. Typically, the surface layer is dark brown gravelly loam about 2 inches thick. The subsurface layer is dark grayish brown gravelly loam about 6 inches thick. The subsoil extends to a depth of about 31 inches. The upper part is yellowish brown gravelly loam, and the lower part is yellowish brown gravelly clay loam. The substratum is brownish gravelly loam about 12 inches thick. Highly weathered shale that has interbedded sandstone and siltstone is below a depth of 43 inches.

Nella soils are predominantly stony throughout. Stones that are about 10 to 24 inches in diameter and 10 to 70 feet apart are on the surface. Typically, the surface layer is brown stony fine sandy loam about 6 inches thick. The subsurface layer extends to a depth of about 12 inches. It is light yellowish brown stony loam. The subsoil extends to a depth of about 63 inches. It is stony clay loam and cobbly clay loam. The upper part is yellowish red, the next part is red and has brownish mottles, and the lower part is red and has brownish and reddish mottles.

Of minor extent in this unit are the well drained Allen, Gorgas, Nauvoo, and Townley soils. These soils are on foot slopes or in other areas on uplands.

The main management concern is the slope. The potential woodland productivity is moderate.

Broad Land Use Considerations

Most of the acreage in the survey area is used as woodland, pasture, cropland, or urban or built-up land. The general soil map can be used for broad planning, but it cannot be used to locate the site for a specific structure. The data in this survey about specific soils can be helpful in planning future land use patterns.

About 50 percent of the survey area is used as woodland. Most of the woodland supports hardwoods. Areas of woodland are in all of the general soil map units, but the woodland is concentrated in the moderately steep or steep Townley-Tidings map unit, the moderately steep to very steep Minvale-Bodine-Fullerton map unit, and the steep and very steep Tidings-Nella map unit. On most of the soils in Catoosa County, the potential productivity for woodland is moderate.

About 30 percent of the survey area is used as pasture. Most of the pasture is in areas of the nearly level and very gently sloping Chenneby-Rome map unit, the very gently sloping to strongly sloping Lyerly-Talbott map unit, the nearly level to moderately steep Townley-Cunningham-Conasauga map unit, and the very gently sloping to strongly sloping Minvale-Fullerton map unit. Most of the soils in the county are well suited to pasture, but a few are only moderately suited.

About 15 percent of the survey area is urban or built-up land. The urban or built-up land is mostly in areas of very gently sloping to strongly sloping soils, such as those in the Lyerly-Talbott and Minvale-Fullerton map units. The soils in the Lyerly-Talbott map unit, however, are not well suited to urban development because of restricted permeability, the depth to bedrock, and an excessive shrink-swell potential. The soils in the Minvale-Fullerton map unit are generally well suited to urban development, but the slope is a management concern in some areas.

About 5 percent of the survey area is used as cropland. Most of the cropland is in the nearly level and very gently sloping Chenneby-Rome map unit. Except where they are subject to occasional flooding, the soils in this map unit are well suited to cultivated crops. Some of the cropland is in very gently sloping to strongly sloping areas in the uplands, including areas of the Lyerly-Talbott, Townley-Cunningham-Conasauga, and Minvale-Fullerton map units. Most of the soils in these map units are moderately suited to cultivated crops, and some of the very gently sloping soils are well suited.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability of a soil for specific uses. They also can be used to plan the management needed for those uses. A soil is well suited to a particular use if it has properties that are favorable; moderately suited if it has properties that require special planning and management to obtain satisfactory performance; and poorly suited if it has properties that are unfavorable. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Lyerly silty clay loam, 2 to 6 percent slopes, is a phase of the Lyerly series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called soil complexes. A *soil complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tidings-Townley complex, 10 to 25 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The Rock outcrop in the map unit Lyerly-Rock outcrop complex, 2 to 10 percent slopes, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The "Glossary" defines many of the terms used in describing the soils.

AnB—Allen silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on foot slopes in the uplands. Slopes are smooth and convex.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part is yellowish brown fine sandy loam and red sandy clay loam, the next part is red clay loam, and the lower part is red clay that has yellowish and brownish mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Holston, Nella, and Tidings soils. These soils are in landscape positions similar to those of the Allen soil.

The Allen soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, shortleaf pine, and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is well suited to most kinds of urban and recreational development, but the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Also, the irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

AnC—Allen silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on foot slopes and the lower part of hillsides in the uplands. Slopes are smooth and convex.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of 99 inches or more. The upper part is yellowish brown fine sandy loam and yellowish red sandy clay loam, the next part is red clay loam that has brownish mottles, and the lower part is red sandy clay that has brownish mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Tidings soils. These soils are in landscape positions similar to those of the Allen soil.

The Allen soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, shortleaf pine, and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

AnD—Allen silt loam, 10 to 15 percent slopes. This well drained, strongly sloping soil is mainly on the lower part of hillsides in the uplands. Slopes are smooth and convex.

Typically, the surface layer is brown silt loam about 5 inches thick. The next layer to a depth of 14 inches is silt loam. The upper part is brown, and the lower part is strong brown. The subsoil extends to a depth of 80 inches or more. The upper part is brown and strong brown fine sandy loam and strong brown sandy clay loam, the next part is yellowish red clay loam, and the lower part is strong brown sandy clay loam.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Holston, Nella, and Tidings soils. Holston and Nella soils are on foot slopes in the uplands. Tidings soils are in landscape positions similar to those of the Allen soil.

The Allen soil is poorly suited to field crops because of the slope. It is moderately suited to hay and pasture. Erosion is a hazard if cultivated areas are not protected.

The potential productivity of this soil for woodland is moderate. Yellow poplar, shortleaf pine, and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6A.

AnE—Allen silt loam, 15 to 25 percent slopes. This well drained, moderately steep soil is on the lower part of hillsides in the uplands. Slopes are smooth and convex.

Typically, the surface layer is brown silt loam about 5 inches thick. The next layer to a depth of 14 inches is light yellowish brown silt loam. The subsoil extends to a depth of 60 inches or more. It is mainly clay loam. The

upper part is yellowish red, the next part is yellowish red and has brownish mottles, and the lower part is red and has brownish and yellowish mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Holston, Nella, and Tidings soils. Holston soils are on foot slopes in the uplands. Nella soils are on foot slopes and hillsides in the uplands. Tidings soils are in landscape positions similar to those of the Allen soil.

The Allen soil is not suited to field crops because of the slope. It is moderately suited to hay and pasture.

The potential productivity of this soil for woodland is moderate. Shortleaf pine and Virginia pine are the preferred trees to plant. Because this soil is moderately steep, the main management concerns are the hazard of erosion, the equipment limitation, and seedling mortality. Applying woodland management practices and harvesting on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Proper planting procedures generally can increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIe, and the woodland ordination symbol is 3R.

AoC2—Allen clay loam, 6 to 10 percent slopes, eroded. This well drained, gently sloping soil is on foot slopes and the lower part of hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is brown clay loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is red clay loam, the next part is red and strong brown clay loam, and the lower part is red and strong brown clay.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is poor because of the eroded clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen soils that are not eroded. These soils are in landscape positions similar to those of the eroded Allen soil.

The Allen soil is poorly suited to field crops because of poor tilth and the slope. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated areas are not protected. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Yellow poplar, shortleaf pine, and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6A.

ApB—Apison loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on ridgetops in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is dark brown loam about 6 inches thick. The subsoil extends to a depth of about 37 inches. It is mainly clay loam. The upper part is mainly yellowish brown, and the lower part is mottled with brownish colors. Shale bedrock that has interbedded sandstone is below a depth of 37 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The effective root zone is limited by the shale bedrock at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Armuchee, Cunningham, Tidings, and Townley soils. These soils are in landscape positions similar to those of the Apison soil.

The Apison soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. Applying a system of conservation tillage, establishing cover crops, and

including grasses and legumes in the cropping system help to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Shortleaf pine and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the depth to shale bedrock. Also, the irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures. The soil is well suited to most kinds of recreational development.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

ApC—Apison loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on ridgetops in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is dark brown loam about 4 inches thick. The subsoil extends to a depth of about 31 inches. It is mainly clay loam. The upper part is mainly yellowish brown, and the lower part has brownish or reddish mottles. Shale bedrock that has interbedded sandstone is below a depth of 31 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The effective root zone is limited by the shale bedrock at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Armuchee, Cunningham, Tidings, and Townley soils. These soils are in landscape positions similar to those of the Apison soil.

The Apison soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Shortleaf pine and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the depth to shale bedrock and the slope. It is only moderately suited to most kinds of recreational development because of the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

ArC—Armuchee channery silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on ridgetops and hillsides in the uplands. The depth to bedrock ranges from 20 to 36 inches. Slopes are smooth and convex.

Typically, the surface layer is dark brown channery silt loam about 5 inches thick. The subsoil to a depth of about 13 inches is strong brown channery silty clay. Below this to a depth of about 31 inches is yellowish, brownish, and reddish extremely channery silty clay. Weathered, noncalcareous shale is below a depth of 31 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderately slow. Available water capacity is low. Tilth is fair. The effective root zone is limited by the underlying shale.

Included with this soil in mapping are a few small areas of Tidings and Townley soils and shale outcrops. These included areas are in landscape positions similar to those of the Armuchee soil.

The Armuchee soil is poorly suited to field crops because of the slope. It is moderately suited to hay and pasture. Erosion is a hazard if cultivated areas are not protected.

The potential productivity of this soil for woodland is moderate. Loblolly pine and shortleaf pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the irrigation of lawns and gardens is limited by the slope. The soil is only moderately suited to most kinds of recreational development because of the slope and small stones. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6A.

BoE—Bodine cobbly silt loam, 10 to 25 percent slopes, very stony. This somewhat excessively drained, strongly sloping and moderately steep soil is on narrow ridgetops and the upper part of hillsides in the uplands. Stones that are about 17 inches in diameter and 4 to 35 feet apart are on the surface. Slopes are mostly smooth and concave.

Typically, the surface layer is dark grayish brown cobbly silt loam about 5 inches thick. The subsurface layer to a depth of about 14 inches is pale brown gravelly silt loam. The subsoil extends to a depth of 65

inches or more. It is very gravelly silt loam. The upper part is brownish yellow, and the lower part is strong brown.

Natural fertility and the content of organic matter are low. Permeability is moderately rapid. Available water capacity is low. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Fullerton, Minvale, and Shack soils. These soils are well drained and are in landscape positions similar to those of the Bodine soil.

The Bodine soil is not suited to field crops because of the slope, the low available water capacity, and the stoniness of the surface layer. It is poorly suited to hay and pasture.

The potential productivity of this soil for woodland is moderate. Loblolly pine and shortleaf pine are the preferred trees to plant. Because this soil is strongly sloping and moderately steep, the hazard of erosion and the equipment limitation are management concerns. Harvesting and otherwise managing the woodland on the contour and properly locating roads, skid trails, and log decks can effectively reduce the hazard of erosion. Special equipment may be needed, and conventional equipment should be used in a manner that keeps soil compaction to a minimum. In areas where equipment use is concentrated, chiseling or subsoiling can reduce compaction and promote revegetation.

This soil is poorly suited to urban and recreational development because of the slope.

The capability subclass is VIs, and the woodland ordination symbol is 4R.

BoF—Bodine cobbly silt loam, 25 to 60 percent slopes, very stony. This somewhat excessively drained, steep and very steep soil is on narrow ridgetops and on hillsides in the uplands. Stones that are about 17 inches in diameter and 4 to 35 feet apart are on the surface. Slopes are convex and irregular.

Typically, the surface layer is dark grayish brown cobbly silt loam about 4 inches thick. The subsurface layer to a depth of about 12 inches is pale brown gravelly silt loam. The subsoil extends to a depth of 65 inches or more. The upper part is light yellowish brown very gravelly silt loam, the next part is yellowish brown very gravelly silty clay loam, and the lower part is strong brown very gravelly silty clay loam.

Natural fertility and the content of organic matter are low. Permeability is moderately rapid. Available water capacity is low. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Fullerton, Minvale, and Shack soils and soils that have a very cobbly surface layer. These soils are well drained and are in landscape positions similar to those of the Bodine soil.

The Bodine soil is not suited to field crops, hay, and pasture because of the slope, the low available water capacity, and the stoniness of the surface layer.

The potential productivity of this soil for woodland is moderate. Virginia pine, shortleaf pine, and eastern redcedar are the preferred trees to plant. Because this soil is steep and very steep, the main management concerns are the hazard of erosion, the equipment limitation, and seedling mortality. Harvesting and otherwise managing the woodland on the contour and properly locating roads, skid trails, and log decks can effectively reduce the hazard of erosion. Special equipment may be needed, and conventional equipment should be used in a manner that keeps soil compaction to a minimum. In areas where equipment use is concentrated, chiseling or subsoiling can reduce compaction and promote revegetation. Proper planting procedures generally can increase the rate of seedling survival. In places, a chisel or subsoiler can also increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development because of the slope.

The capability subclass is VIIs, and the woodland ordination symbol is 3R.

CaB—Capshaw silt loam, 2 to 6 percent slopes. This moderately well drained, very gently sloping soil is on broad uplands. The depth to bedrock ranges from 48 to more than 60 inches. Slopes are smooth and convex.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 52 inches. The upper part is yellowish brown silty clay loam, and the lower part is yellowish brown silty clay or clay that has grayish, brownish, and reddish mottles. The substratum is mottled brownish and reddish clay about 9 inches thick. Limestone bedrock is at a depth of about 61 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is slow. Available water capacity is high. Tilth is good. The effective root zone is limited by the hard bedrock below a depth of 48 inches and by the seasonal high water table, which is at a depth of 3.5 to 5.0 feet from late fall to early spring.

Included with this soil in mapping are a few small areas of Lyerly and Tupelo soils. Lyerly soils are in landscape positions similar to those of the Capshaw soil. The somewhat poorly drained Tupelo soils are in upland depressions.

The Capshaw soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system,

a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, and yellow poplar are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses mainly because of the depth to bedrock and a moderate shrink-swell potential. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields and for most kinds of recreational development. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

Cb—Cedarbluff loam, occasionally flooded. This somewhat poorly drained, nearly level soil is on stream terraces and in upland depressions. It is occasionally flooded from late fall to midspring. The slope is 0 to 2 percent.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil extends to a depth of 62 inches or more. It is mainly clay loam. It is brownish throughout and has grayish mottles. It is dense and brittle in the middle part.

Natural fertility is medium, and the content of organic matter is low. Permeability is moderate in the upper part of the profile and slow in the lower part. Available water capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the seasonal high water table, which is at a depth of 0.5 to 1.0 foot from midfall to midspring.

Included with this soil in mapping are a few small areas of Rome, Wax, and Whitwell soils. The well drained Rome and moderately well drained Whitwell soils are on stream terraces. The moderately well drained Wax soils are on foot slopes in the uplands and near drainageways.

The Cedarbluff soil is only moderately suited to field crops, hay, and pasture because of the occasional flooding and the somewhat restricted effective root zone. A drainage system is needed to reduce the damage caused by flooding.

The potential productivity of this soil for woodland is high. Loblolly pine, sweetgum, and water oak are the preferred trees to plant. The seasonal wetness limits the use of conventional equipment and increases the seedling mortality rate. The wetness generally can be overcome by using modified or special equipment or by scheduling planting and harvesting activities for the drier periods. Bedding, controlling competing plants, and planting adapted trees generally can increase the rate of seedling survival.

This soil is poorly suited to recreational development because of wetness and flooding. The wetness and the flooding also severely limit the use of this soil for urban development.

The capability subclass is IIIw, and the woodland ordination symbol is 9W.

Ce—Chenneby silt loam, occasionally flooded. This somewhat poorly drained, nearly level soil is on flood plains. It is occasionally flooded from winter to late spring. The slope is 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil to a depth of 60 inches or more is silt loam. The upper part is dark yellowish brown, the next part is yellowish brown and has grayish mottles, and the lower part is mainly grayish brown and has yellowish brown mottles.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is fair. The root zone usually is deep, but it is restricted from winter to late spring, when the water table is at a depth of 1.0 foot to 2.5 feet.

Included with this soil in mapping are a few small areas of the well drained Rome soils and soils that are moderately well drained. These soils are on stream terraces. Also included are a few small areas of poorly drained soils in landscape positions similar to those of the Chenneby soil.

The Chenneby soil is only moderately suited to field crops because of the occasional flooding during the planting period. It is well suited to hay and pasture. A drainage system is needed to reduce the damage caused by flooding.

The potential productivity of this soil for woodland is high. Loblolly pine, yellow poplar, sweetgum, water oak, and American sycamore are the preferred trees to plant. The seasonal wetness limits the use of conventional equipment and increases the seedling mortality rate. The wetness generally can be overcome by using modified or special equipment or by scheduling planting and harvesting activities for the drier periods. Bedding, controlling competing plants, and planting adapted trees generally can increase the rate of seedling survival.

This soil is poorly suited to recreational development because of flooding and wetness. The wetness and the flooding also severely limit the use of this soil for urban development.

The capability subclass is IIw, and the woodland ordination symbol is 11W.

CoB—Conasauga silt loam, 1 to 6 percent slopes. This moderately well drained, nearly level and very gently sloping soil is on ridgetops and foot slopes in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The next layer to a depth of about 6 inches is brown silt loam. The subsoil extends to a depth of about 36 inches. The upper part is yellowish brown silty clay loam, the next part is yellowish brown silty clay, and the lower part is brownish yellow silty clay that has brownish mottles. Weathered shale bedrock that has rock-controlled structure is below a depth of 36 inches.

Natural fertility is medium, and the content of organic matter is low. Permeability is slow. Available water capacity is moderate. Tilth is good. The effective root zone is limited by the underlying shale at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of the well drained Cunningham and well drained or moderately well drained Lyerly soils. These soils are in landscape positions similar to those of the Conasauga soil.

The Conasauga soil is moderately suited to field crops, hay, and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, and Virginia pine are the preferred trees to plant. The hazard of erosion and the equipment limitation are management concerns. Erosion should be minimized by harvesting and otherwise managing the woodland on the contour. The equipment should be used in a manner that keeps soil compaction to a minimum. In areas where equipment use is concentrated, chiseling or subsoiling can reduce compaction and promote revegetation after harvesting.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. The soil is only moderately suited to most kinds of recreational development mainly because of the restricted permeability. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 8C.

CoC—Conasauga silt loam, 6 to 10 percent slopes. This moderately well drained, gently sloping soil is on foot slopes and hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil extends to a depth of about 28 inches. The upper part is yellowish brown silty clay loam, the next part is light yellowish brown silty clay that has reddish mottles, and the lower part is brownish yellow clay that has grayish and reddish mottles. Shale bedrock that has rock-controlled structure is below a depth of 28 inches.

Natural fertility is medium, and the content of organic matter is low. Permeability is slow. Available water capacity is moderate. Tilth is good. The effective root zone is limited by the underlying shale at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of the well drained Cunningham and well drained or moderately well drained Lyerly soils. These soils are in landscape positions similar to those of the Conasauga soil.

The Conasauga soil is not suited to field crops because of the slope. It is moderately suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, and Virginia pine are the preferred trees to plant. The hazard of erosion and the equipment limitation are management concerns. Erosion should be minimized by harvesting and otherwise managing the woodland on the contour. The equipment should be used in a manner that keeps soil compaction to a minimum. In areas where equipment use is concentrated, chiseling or subsoiling can reduce compaction and promote revegetation after harvesting.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. The soil is only moderately suited to most kinds of recreational development mainly because of the restricted permeability and the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe, and the woodland ordination symbol is 8C.

CuB—Cunningham silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on ridgetops in the uplands. The depth to bedrock ranges from 40 to 60 inches. Slopes are smooth and convex.

Typically, the surface layer is yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of about 46 inches. The upper part is reddish yellow silty clay loam, the next part is mainly yellowish red silty clay, and the lower part is reddish yellow and yellowish red shaly silty clay. Below this is several inches of reddish yellow and yellowish red, weathered fragments of shale and siltstone over weathered shale bedrock.

Natural fertility is medium, and the content of organic matter is low. Permeability is slow. Available water capacity is moderate. Tilth is good. The effective root zone is limited by the underlying shale at a depth of 40 to 60 inches.

Included with this soil in mapping are a few small areas of Townley soils. These soils are in landscape positions similar to those of the Cunningham soil.

The Cunningham soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. The soil is only moderately suited to most kinds of recreational development because of the restricted permeability. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

CuC—Cunningham silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on narrow ridgetops and on hillsides in the uplands. The depth to bedrock ranges from 40 to 60 inches. Slopes are smooth and convex.

Typically, the surface layer is yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of about 46 inches. The upper part is reddish yellow silty clay loam, the next part is yellowish red and reddish yellow silty clay, and the lower part is reddish yellow and yellowish red shaly silty clay that has a few weathered fragments of shale. Below this to a depth of about 58 inches are reddish yellow and yellowish red, weathered, soft fragments of shale and siltstone.

Natural fertility is medium, and the content of organic matter is low. Permeability is slow. Available water capacity is moderate. Tilth is good. The effective root zone is limited by the underlying shale at a depth of 40 to 60 inches.

Included with this soil in mapping are a few small areas of Townley soils. These soils are in landscape positions similar to those of the Cunningham soil.

The Cunningham soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential and the slope. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is only moderately suited to most kinds of recreational development because of the restricted permeability and the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

CuD—Cunningham silt loam, 10 to 15 percent slopes. This well drained, strongly sloping soil is mainly on hillsides in the uplands. The depth to bedrock ranges from 40 to 60 inches. Slopes are smooth and convex.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 42 inches. The upper part is yellowish red clay loam, the next part is yellowish red silty clay that has yellowish and brownish mottles, and the lower part is shaly clay loam that has reddish, brownish, and yellowish mottles. Below this is several inches of reddish yellow and yellowish red, weathered fragments of shale and siltstone over weathered shale bedrock.

Natural fertility is medium, and the content of organic matter is low. Permeability is slow. Available water capacity is moderate. Tilth is good. The effective root zone is limited by the underlying shale at a depth of 40 to 60 inches.

Included with this soil in mapping are a few small areas of Tidings and Townley soils. These soils are in landscape positions similar to those of the Cunningham soil.

The Cunningham soil is poorly suited to field crops because of the slope. It is moderately suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential and the slope. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is only moderately suited to most kinds of recreational development mainly because of the restricted permeability and the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6A.

CxD2—Cunningham silty clay loam, 6 to 15 percent slopes, eroded. This well drained, gently sloping and strongly sloping soil is on hillsides in the uplands. The depth to bedrock ranges from 40 to 60 inches. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is reddish yellow silty clay loam about 5 inches thick. The subsoil extends to a depth of about 40 inches. The upper part is yellowish red silty clay and clay, and the lower part is reddish yellow silty clay and clay that has weathered fragments of shale. Below this are predominantly reddish yellow and yellowish red, weathered fragments of shale and siltstone over weathered shale bedrock.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is moderate. Tilth is poor because of the eroded silty clay loam surface layer. The effective root zone is limited by the underlying shale at a depth of 40 to 60 inches.

Included with this soil in mapping are a few small areas of Townley soils and soils that have more than 15 percent shale fragments throughout the solum. These soils are in landscape positions similar to those of the Cunningham soil.

The Cunningham soil is not suited to field crops because of the poor tilth and the slope. It is poorly suited to hay and pasture. Further erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. The main management concern is minimizing further erosion. The equipment limitation and seedling mortality are additional management concerns. Harvesting and otherwise managing the woodland on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvesting, and using erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods can help to keep erosion within acceptable limits and keep soil compaction to a minimum. Proper planting procedures generally can increase the rate of seedling survival. A chisel or subsoiler can promote revegetation in compacted areas and can increase the rate of seedling survival.

This soil is only moderately suited to most urban uses because of the shrink-swell potential and the slope. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is only moderately suited to most kinds of recreational development because of the restricted permeability and the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe, and the woodland ordination symbol is 7C.

DaB—Decatur silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is mainly on ridgetops in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part is dark red silty clay, and the lower part is dark red clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Dewey, Emory, and Fullerton soils. Dewey and Fullerton soils are in landscape positions similar to those of the Decatur soil. Emory soils are in depressions in the uplands.

The Decatur soil is well suited to field crops, hay,

and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, loblolly pine, and shortleaf pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential. Also, the irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures. The soil is well suited to septic tank absorption fields and to most kinds of recreational development.

The capability subclass is IIe, and the woodland ordination symbol is 7A.

DaC—Decatur silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on hillsides in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is dark reddish brown silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. It is dark red silty clay or clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Dewey and Fullerton soils. These soils are in landscape positions similar to those of the Decatur soil.

The Decatur soil is only moderately suited to field crops. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, loblolly pine, and shortleaf pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential and the slope. Also, it is only moderately suited to septic tank absorption fields and most kinds of recreational development because of the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 7A.

DcC2—Decatur silty clay loam, 6 to 10 percent slopes, eroded. This well drained, gently sloping soil is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is dark reddish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part is dark red silty clay, and the lower part is dark red clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is poor because of the eroded silty clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Dewey and Fullerton soils. These soils are in landscape positions similar to those of the Decatur soil.

The Decatur soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated areas are not protected. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Yellow poplar, loblolly pine, and shortleaf pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential and the slope. Also, it is only moderately suited to septic tank absorption fields and most kinds of recreational development because of the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 7A.

DcD2—Decatur silty clay loam, 10 to 15 percent slopes, eroded. This well drained, strongly sloping soil is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is dark reddish brown silty clay loam about 7 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part is dark red

clay loam, the next part is dark red clay, and the lower part is red clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is poor because of the eroded silty clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Dewey and Fullerton soils and soils that have a very cobbly silty clay loam surface layer. These soils are in landscape positions similar to those of the Decatur soil.

The Decatur soil is not suited to field crops because of the poor tilth and the slope. It is poorly suited to hay and pasture. Further erosion is a severe hazard if cultivated areas are not protected. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Yellow poplar, loblolly pine, and shortleaf pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential and the slope. Also, it is only moderately suited to septic tank absorption fields and most kinds of recreational development because of the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe, and the woodland ordination symbol is 7A.

DeB—Dewey silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is mainly on ridgetops in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is dark reddish brown silt loam about 10 inches thick. The subsoil extends to a depth of 62 inches or more. It is clay. The upper part is dark red, and the lower part is red.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Decatur, Emory, and Fullerton soils. Decatur and Fullerton soils are in landscape positions similar to those of the Dewey soil. Emory soils are in depressions in the uplands.

The Dewey soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, black walnut, and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential. Also, the moderate permeability is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures. The soil is well suited to most kinds of recreational development.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

DeC—Dewey silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on hillsides in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is dark reddish brown silt loam about 5 inches thick. The subsoil extends to a depth of 62 inches or more. The upper part is dark red silty clay loam or clay, and the lower part is mainly red clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Decatur and Fullerton soils. These soils are in landscape positions similar to those of the Dewey soil.

The Dewey soil is only moderately suited to field crops. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, black walnut, and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential. Also, the moderate permeability is a limitation on sites for septic tank absorption fields. The soil is only moderately suited to most kinds of recreational development because of

the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

Em—Emory silt loam. This well drained, nearly level and very gently sloping soil is near streams, on foot slopes, and in depressions in the uplands. The slope is 0 to 3 percent.

Typically, the recent local alluvium extends to a depth of about 22 inches. It is dark reddish brown silt loam. The buried soil extends to a depth of 62 inches or more. The upper part is dark reddish brown silt loam and silty clay loam, and the lower part is dark red silty clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Decatur, Dewey, and Ennis soils. Decatur and Dewey soils are in the uplands. Ennis soils are in depressions in the uplands. Also included are a few small areas of soils that are ponded from late fall to early spring. These soils are also in depressions in the uplands.

The Emory soil is well suited to field crops, hay, and pasture. Applying a system of conservation tillage, establishing cover crops, and including grasses and legumes in the cropping system help to maintain the content of organic matter and conserve moisture.

The potential productivity of this soil for woodland is high. Yellow poplar, black walnut, and loblolly pine are the preferred trees to plant. No significant limitations affect woodland.

This soil is well suited to most kinds of urban and recreational development, but the moderate permeability is a limitation on sites for septic tank absorption fields. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability class is I, and the woodland ordination symbol is 8A.

Es—Ennis gravelly silt loam, 0 to 3 percent slopes, occasionally flooded. This nearly level and very gently sloping, well drained soil is on flood plains, on foot slopes, and in depressions in the uplands. It is subject to occasional flooding, mainly during winter.

Typically, the surface layer is grayish brown gravelly silt loam about 9 inches thick. The subsoil extends to a depth of 36 inches. The upper part is yellowish brown gravelly loam, and the lower part is yellowish brown gravelly silt loam that has brownish mottles. The substratum extends to a depth of 63 inches or more. The upper part is brownish gravelly loam, and the lower part is brownish gravelly silty clay loam.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderately rapid. Available water capacity is moderate. Tilth is good in most places. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Emory and Shack soils. Emory soils are near streams. Shack soils are on hillsides in the uplands.

The Ennis soil is well suited to field crops, hay, and pasture. Applying a system of conservation tillage, establishing cover crops, and including grasses and legumes in the cropping system help to maintain the content of organic matter and conserve moisture.

The potential productivity of this soil for woodland is high. Yellow poplar, black walnut, and loblolly pine are the preferred trees to plant. No significant limitations affect woodland.

This soil is poorly suited to most kinds of recreational development because of small stones. The flooding severely limits most urban uses.

The capability subclass is IIw, and the woodland ordination symbol is 8A.

EtB—Etowah loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on stream terraces and on foot slopes in the uplands. Slopes are smooth and convex.

Typically, the surface layer is dark reddish brown loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is mainly yellowish red silty clay loam, the next part is strong brown silty clay loam, and the lower part is strong brown clay loam that has yellow mottles.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Holston, Rome, and Whitwell soils. Holston soils are in landscape positions similar to those of the Etowah soil. Rome soils and the moderately well drained Whitwell soils are on stream terraces.

The Etowah soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the

preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is well suited to most kinds of urban and recreational development, but the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

EtC—Etowah loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on stream terraces and on foot slopes in the uplands. Slopes are smooth and convex.

Typically, the surface layer is dark reddish brown loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. It is silty clay loam. The upper part is reddish brown, and the lower part is yellowish red.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Holston, Rome, and Tupelo soils and soils that have a silty clay loam surface layer. Holston soils and the soils that have a silty clay loam surface layer are on foot slopes in the uplands. Rome soils and the somewhat poorly drained Tupelo soils are on stream terraces.

The Etowah soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development because of the slope. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

FeB—Fullerton gravelly silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is mainly on ridgetops in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. The upper part is strong brown gravelly silty clay loam, and the lower part is predominantly red gravelly clay that has reddish yellow mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is fair. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Minvale and Shack soils. These soils are in landscape positions similar to those of the Fullerton soil. Also included are a few small areas of the moderately well drained Wax soils on foot slopes in the uplands.

The Fullerton soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most urban uses because of the shrink-swell potential. Also, the moderate permeability is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. The soil is poorly suited to recreational development because of the gravelly surface layer. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

FeC—Fullerton gravelly silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is mainly on hillsides in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. The upper part is strong brown

gravelly silty clay loam, the next part is red gravelly clay, and the lower part is red and yellowish red gravelly clay that has reddish yellow mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is fair. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Bodine and Minvale soils. These soils are in landscape positions similar to those of the Fullerton soil. Bodine soils are somewhat excessively drained.

The Fullerton soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to urban uses because of the shrink-swell potential and the slope. Also, the moderate permeability is a limitation on sites for septic tank absorption fields. The soil is poorly suited to recreational development because of the gravelly surface layer. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

FeD—Fullerton gravelly silt loam, 10 to 15 percent slopes. This well drained, strongly sloping soil is mainly on hillsides in the uplands. Slopes are mostly smooth and convex.

Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. It is mainly red. The upper part is gravelly silty clay loam, and the lower part is gravelly clay.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is fair. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Bodine soils, Minvale soils, and soils that have less than 15 percent cobbles or gravel in the surface layer. These soils are in landscape positions similar to those of the Fullerton soil.

The Fullerton soil is poorly suited to field crops because of the slope. It is moderately suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to urban uses because of the shrink-swell potential and the slope. Also, the moderate permeability is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures. The soil is poorly suited to recreational development because of the gravelly surface layer.

The capability subclass is IVe, and the woodland ordination symbol is 6A.

FeE—Fullerton gravelly silt loam, 15 to 40 percent slopes. This well drained, moderately steep and steep soil is on hillsides in the uplands. Slopes are smooth and complex.

Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. It is mainly gravelly clay. The upper part is strong brown, the next part is red, and the lower part is red and yellowish red and has yellowish mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Bodine soils, Minvale soils, and soils that have less than 15 percent cobbles or gravel in the surface layer. These soils are in landscape positions similar to those of the Fullerton soil.

The Fullerton soil is not suited to field crops because of the slope. It is moderately suited to hay and pasture.

The potential productivity of this soil for woodland is moderate. Loblolly pine and yellow poplar are the preferred trees to plant. Because this soil is moderately steep and steep, the main management concerns are the hazard of erosion and the equipment limitation. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the

hazard of further erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIe, and the woodland ordination symbol is 6R.

FrE2—Fullerton gravelly silty clay loam, 10 to 25 percent slopes, eroded. This well drained, strongly sloping and moderately steep soil is on hillsides in the uplands. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular.

Typically, the surface layer is brown gravelly silty clay loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. The upper part is red or yellowish red gravelly silty clay, and the lower part is red gravelly clay.

Natural fertility and the content of organic matter are low. Permeability is moderate. Available water capacity also is moderate. Tilth is poor because of the eroded gravelly silty clay loam surface layer. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of the somewhat excessively drained Bodine soils, Minvale soils, and Shack soils. These soils are in landscape positions similar to those of the Fullerton soil.

The Fullerton soil is poorly suited to field crops because of the slope and the poor tilth. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated crops are grown. Including grasses in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Loblolly pine and yellow poplar are the preferred trees to plant. Because this soil is highly susceptible to erosion, the main management concern is minimizing further erosion. The equipment limitation is an additional management concern. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of further erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is IVe, and the woodland ordination symbol is 6R.

FuC—Fullerton-Urban land complex, 2 to 10 percent slopes. This map unit consists of areas of Fullerton gravelly silt loam and Urban land. It is on very gently sloping and gently sloping ridgetops and hillsides in the uplands. Slopes are smooth and convex.

The Fullerton soil makes up about 55 percent of this map unit. Typically, the surface layer is brown gravelly silt loam about 6 inches thick. The subsoil extends to a depth of 99 inches or more. The upper part is strong brown gravelly silty clay loam, the next part is red gravelly clay, and the lower part is red and yellowish red gravelly clay that has reddish yellow mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Urban land makes up about 45 percent of this map unit. It consists mostly of shopping centers, schools, parking lots, industrial centers, streets, commercial buildings, and private dwellings. The soils have been altered by cutting, filling, and shaping.

Included in mapping are a few small areas of the somewhat excessively drained Bodine soils and Minvale soils. These soils are in landscape positions similar to those of the Fullerton soil.

The Fullerton soil is only moderately suited to most urban uses because of the shrink-swell potential. Also, the moderate permeability is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. The soil is poorly suited to recreational development because of the gravelly surface layer. Generally, these limitations can be overcome by special design and proper installation procedures. Home vegetable gardens and the plants commonly used for landscaping grow well. Until permanent plant cover is established, the hazard of

erosion is severe in the more sloping areas. Tilling across the slope and establishing winter cover crops help to control erosion.

No capability classification or woodland ordination symbol is assigned.

HoB—Holston fine sandy loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on stream terraces. Slopes are smooth and convex.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of 62 inches or more. The upper part is yellowish brown loam, the next part is yellowish brown clay loam, and the lower part is mottled yellowish, brownish, and reddish clay loam.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen and Rome soils. Allen soils are on foot slopes in the uplands. Rome soils are in landscape positions similar to those of the Holston soil.

The Holston soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is well suited to most kinds of urban and recreational development, but the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

HoC—Holston fine sandy loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on foot slopes in the uplands. Slopes are smooth and convex.

Typically, the surface layer is light yellowish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of 62 inches or more. The upper part is yellowish brown sandy clay loam, the next part is yellowish brown clay loam that has yellowish red and brownish yellow mottles, and the lower part is brownish yellow clay loam that has yellow and yellowish red mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen soils. These soils are in landscape positions similar to those of the Holston soil.

The Holston soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development. The slope is the main limitation. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

Ke—Ketona silty clay loam, frequently flooded. This poorly drained, nearly level soil is on flood plains. It is frequently flooded from late fall to midspring. The slope is 0 to 2 percent.

Typically, the surface layer is dark brown silty clay loam about 10 inches thick. It has light brownish gray mottles. The subsoil extends to a depth of 76 inches or more. It is clay. The upper part is gray and has brownish mottles, and the lower part is light brownish gray and has yellowish and brownish mottles.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is slow. Available water capacity is moderate. Tilth is poor. The root zone is usually deep, but it is restricted from late fall to midspring, when the water table is at a depth of 0.5 to 1.0 foot.

Included with this soil in mapping are a few small areas of the somewhat poorly drained Chenneby and Tupelo soils. Chenneby soils are in landscape positions similar to those of the Ketona soil. Tupelo soils are on stream terraces.

The Ketona soil is poorly suited to field crops, hay, and pasture because of wetness and flooding.

The potential productivity of this soil for woodland is moderate. Sweetgum, loblolly pine, and water oak are the preferred trees to plant. The seasonal wetness limits the use of conventional equipment and increases the seedling mortality rate. The equipment limitation generally can be overcome by using modified equipment or by scheduling planting and harvesting activities for the drier periods. Improving drainage and controlling competing plants generally can increase the rate of seedling survival.

This soil is poorly suited to most kinds of recreational development because of wetness and flooding. The flooding, the wetness, and the shrink-swell potential severely limit the use of this soil as a site for urban development.

The capability subclass is IVw, and the woodland ordination symbol is 6W.

LeB—Lyerly silty clay loam, 2 to 6 percent slopes. This well drained and moderately well drained, very gently sloping soil is on broad ridgetops and foot slopes in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is brown silty clay loam about 6 inches thick. The subsoil extends to a depth of about 24 inches. It is clay. The upper part is yellowish brown and has yellowish red mottles, and the lower part is light olive brown and has olive and pale yellow mottles. Limestone bedrock is below a depth of 24 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is very slow. Available water capacity is low. Tilth is poor. The effective root zone is limited by the depth to bedrock.

Included with this soil in mapping are a few small areas of Conasauga, Ketona, Rome, and Tupelo soils. Also included, in landscape positions similar to those of the Lyerly soil, are soils that have a silty clay or clay surface layer, soils that have limestone bedrock within a depth of 20 inches, soils that have limestone bedrock at a depth of 40 to more than 60 inches, and a few small areas of rock outcrop. The well drained Conasauga soils are in the uplands. The poorly drained Ketona soils are on flood plains. The well drained Rome soils are on stream terraces. The somewhat poorly drained Tupelo soils are in depressions in the uplands.

The Lyerly soil is only moderately suited to field crops, hay, and pasture mainly because of the low available water capacity. Also, erosion is a moderate hazard if cultivated areas are not protected. Applying a system of conservation tillage, establishing cover crops, and including grasses and legumes in the cropping system help to maintain the content of organic matter and conserve moisture.

The potential productivity of this soil for woodland is moderate. Loblolly pine and eastern redcedar are the preferred trees to plant. The equipment limitation and seedling mortality are management concerns. In areas where equipment use is heavy, soil compaction is an additional concern. In most areas, using modified equipment and scheduling harvesting activities for the drier periods can help to keep compaction to a minimum. A chisel or subsoiler can promote revegetation in compacted areas and can increase the rate of seedling survival. Planting at the proper depth generally can also increase the rate of seedling survival.

This soil is poorly suited to most urban uses because of the shrink-swell potential and the depth to limestone bedrock. Also, the very slow permeability of the subsoil is a limitation on sites for septic tank absorption fields and most kinds of recreational development (fig. 2). The irrigation of lawns and gardens is limited by the slope, the depth to bedrock, and the restricted permeability.

The capability subclass is IIIs, and the woodland ordination symbol is 6C.

LeC—Lyerly silty clay loam, 6 to 10 percent slopes. This well drained and moderately well drained, gently sloping soil is on ridgetops and hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is brown silty clay loam about 6 inches thick. The subsoil extends to a depth of about 32 inches. It is clay. The upper part is yellowish brown, and the lower part is brownish yellow. Fractured limestone bedrock is below a depth of 32 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is very slow. Available water capacity is low. Tilth is poor. The root zone is limited by the depth to bedrock.

Included with this soil in mapping are a few small areas of Conasauga, Rome, Townley, and Tupelo soils, soils that have limestone bedrock within a depth of about 20 inches, and areas of rock outcrop. The well drained Conasauga and Townley soils, the soils that have limestone bedrock within a depth of about 20 inches, and the rock outcrop are in landscape positions similar to those of the Lyerly soil. The well drained Rome soils are on stream terraces. The somewhat poorly drained Tupelo soils are in depressions in the uplands.

The Lyerly soil is poorly suited to field crops mainly because of the low available water capacity. It is moderately suited to hay and pasture. Erosion is a moderate hazard if cultivated areas are not protected. Applying a system of conservation tillage, establishing cover crops, and including grasses and legumes in the

Figure 2.—A golf course in an area of Lyerly silty clay loam, 2 to 6 percent slopes. The depth to bedrock, the shrink-swell potential, and restricted permeability are limitations on sites for some kinds of urban development, but special design and proper installation procedures can help to overcome these limitations.

cropping system help to maintain the content of organic matter and conserve moisture.

The potential productivity of this soil for woodland is moderate. Loblolly pine and eastern redcedar are the preferred trees to plant. The equipment limitation and seedling mortality are management concerns. In areas where equipment use is heavy, soil compaction is an additional concern. Using modified equipment and scheduling harvesting and other woodland management activities during the drier periods help to keep compaction to a minimum in most places. A chisel or subsoiler can promote revegetation after harvesting in compacted areas and can increase the rate of seedling survival. Planting at the proper depth can also increase the rate of seedling survival.

This soil is poorly suited to most urban uses because of the shrink-swell potential and the depth to limestone bedrock. Also, the very slow permeability of the subsoil is a limitation on sites for septic tank absorption fields and most kinds of recreational development. The irrigation of lawns and gardens is limited by the slope, the depth to bedrock, and the restricted permeability.

The capability subclass is IVs, and the woodland ordination symbol is 6C.

LrC—Lyerly-Rock outcrop complex, 2 to 10 percent slopes. This map unit consists of areas of a well drained and moderately well drained Lyerly soil and Rock outcrop. It is on very gently sloping ridgetops and on gently sloping ridgetops and hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches in the Lyerly soil. Slopes are smooth and convex in areas

of the Lyerly soil and irregular in areas of the Rock outcrop.

The Lyerly soil makes up about 60 percent of this map unit. Typically, the surface layer is grayish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of about 20 inches. It is mainly olive clay. Hard, horizontally fractured limestone bedrock is below a depth of 20 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is very slow. Available water capacity is low. Tilth is poor. The root zone is limited by the depth to bedrock.

Rock outcrop makes up about 40 percent of this map unit. The upper 2 to 10 inches is fractured in most places, and soil has accumulated in the fractures.

Included in mapping are a few small areas of soils that have a cobbly or stony surface layer, soils that are less than 20 inches deep over bedrock, and soils that are more than 40 inches deep over bedrock. These soils are in landscape positions similar to those of the Lyerly soil.

This map unit is not suited to field crops mainly because of the low available water capacity and the Rock outcrop. The Lyerly soil is moderately suited to hay and pasture.

The Lyerly soil is wooded, but the Rock outcrop is essentially bare of any vegetation. The potential productivity of the Lyerly soil for woodland is moderate. Loblolly pine and eastern redcedar are the preferred trees to plant. The equipment limitation and seedling mortality are management concerns. In areas where equipment use is heavy, soil compaction is an additional concern. Using modified equipment and scheduling harvesting and other woodland management activities for the drier periods help to keep compaction to a minimum in most areas. A chisel or subsoiler can promote revegetation after harvest in compacted areas and can increase the rate of seedling survival. Planting at the proper depth can also increase the rate of seedling survival.

This map unit is poorly suited to most urban uses because of the shrink-swell potential of the Lyerly soil and because of the Rock outcrop. Also, the Rock outcrop and the very slow permeability of the Lyerly soil are limitations on sites for septic tank absorption fields and most kinds of recreational development. The irrigation of lawns and gardens is limited by the slope, the depth to bedrock, and the restricted permeability.

The capability subclass of the Lyerly soil is IVs, and the woodland ordination symbol is 6C. No capability classification or woodland ordination symbol is assigned for the Rock outcrop.

LuC—Lyerly-Urban land complex, 2 to 10 percent slopes. This map unit consists of areas of a well drained and moderately well drained Lyerly soil and Urban land. It is on very gently sloping ridgetops and on gently sloping ridgetops and hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches in areas of the Lyerly soil. Slopes are smooth and convex.

The Lyerly soil makes up about 60 percent of this map unit. Typically, the surface layer is grayish brown silty clay loam about 5 inches thick. The subsoil extends to a depth of about 32 inches. It is clay. The upper part is yellowish brown, and the lower part is pale olive. Fractured limestone bedrock is below a depth of 32 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is very slow. Available water capacity is low. Tilth is poor. The root zone is limited by the depth to bedrock.

Urban land makes up about 40 percent of this map unit. It consists mostly of shopping centers, schools, parking lots, industrial centers, streets, commercial buildings, and private dwellings. The soils have been altered by cutting, filling, and shaping.

Included in mapping are a few small areas of soils in the uplands that have been cut and filled. Also included are areas of soils that are more than 40 inches deep over limestone bedrock.

This map unit is poorly suited to most kinds of urban and recreational development because of the very slow permeability, a high shrink-swell potential, and the depth to bedrock. Also, the irrigation of lawns and gardens is limited by the slope.

No capability classification or woodland ordination symbol is assigned.

MsC—Minvale-Shack gravelly silt loams, 6 to 10 percent slopes. This map unit consists of well drained and moderately well drained, gently sloping soils in the uplands. The Minvale soil is in low areas, and the Shack soil is on ridgetops and hillsides.

The Minvale soil makes up about 55 percent of this map unit. Typically, the surface layer is grayish brown gravelly silt loam about 10 inches thick. The subsoil extends to a depth of 65 inches or more. It is strong brown or yellowish red gravelly silty clay loam.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

The Shack soil makes up about 45 percent of this map unit. Typically, the surface layer is dark grayish brown gravelly silt loam about 5 inches thick. The

subsurface layer is light yellowish brown gravelly silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown gravelly silt loam and gravelly loam that has brownish and reddish mottles, the next part is mainly red gravelly silty clay loam that is dense and brittle, and the lower part is red gravelly silty clay loam that has brownish mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderately slow in the brittle part of the subsoil. Available water capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the water table, which is at a depth of 2 to 4 feet in winter.

Included with these soils in mapping are a few small areas of Bodine, Fullerton, and Wax soils. The somewhat excessively drained Bodine and well drained Fullerton soils are in landscape positions similar to those of the Shack soil. The moderately well drained Wax soils are on foot slopes in the uplands.

The Minvale and Shack soils are only moderately suited to field crops because of the slope. They are well suited to hay and pasture. Erosion is a hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of these soils for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

These soils are only moderately suited to most kinds of urban and recreational development mainly because of the slope (fig. 3). Wetness and small stones are management concerns in some areas. Also, the moderate or moderately slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 6A.

MsD—Minvale-Shack gravelly silt loams, 10 to 15 percent slopes. This map unit consists of well drained and moderately well drained, strongly sloping soils in the uplands. The Minvale soil is in low areas, and the Shack soil is on hillsides.

The Minvale soil makes up about 70 percent of the map unit. Typically, the surface layer is grayish brown gravelly silt loam about 10 inches thick. The subsoil extends to a depth of 65 inches or more. It is strong brown or yellowish red gravelly silty clay loam.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

The Shack soil makes up about 30 percent of this map unit. Typically, the surface layer is dark grayish brown gravelly silt loam about 5 inches thick. The subsurface layer is pale olive gravelly silt loam about 7 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part is light yellowish brown gravelly silt loam; the next part is yellowish brown, strong brown, and yellowish red gravelly silty clay loam that is dense and brittle; and the lower part is yellowish brown, strong brown, and yellowish red gravelly silty clay loam that has gray, brown, and yellow mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderately slow in the brittle part of the subsoil. Available water capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the water table, which is at a depth of 2 to 4 feet in winter.

Included with these soils in mapping are a few small areas of Bodine and Fullerton soils. The somewhat excessively drained Bodine and well drained Fullerton soils are in landscape positions similar to those of the Shack soil.

The Minvale and Shack soils are poorly suited to field crops because of the slope. They are moderately suited to hay and pasture. Erosion is a hazard if cultivated areas are not protected.

The potential productivity of these soils for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

These soils are only moderately suited to most kinds of urban and recreational development mainly because of the slope. Wetness and small stones are additional management concerns in places. Also, the moderate or moderately slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6A.

MsE—Minvale-Shack gravelly silt loams, 15 to 25 percent slopes. This map unit consists of well drained and moderately well drained, moderately steep soils in the uplands. The Minvale soil is in low areas, and the Shack soil is on hillsides.

Figure 3.—A subdivision in an area of Minvale-Shack gravelly silt loams, 6 to 10 percent slopes. The slope is the main limitation on sites for urban development.

The Minvale soil makes up about 75 percent of the map unit. Typically, the surface layer is dark grayish brown gravelly silt loam about 5 inches thick. The subsurface layer is light yellowish brown gravelly silt loam about 9 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part is yellowish brown gravelly silt loam, and the lower part is strong brown and yellowish red gravelly silty clay loam.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

The Shack soil makes up about 25 percent of this map unit. Typically, the surface layer is dark grayish brown gravelly silt loam about 5 inches thick. The subsurface layer is pale olive gravelly silt loam about 7 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part is light yellowish brown and yellowish brown gravelly silt loam, and the lower part is yellowish brown, strong brown, or yellowish red gravelly silty clay loam that has red, brown, and gray mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderately slow in the brittle part of the subsoil. Available water

capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the water table, which is at a depth of 2 to 4 feet in winter.

Included with these soils in mapping are a few small areas of Bodine and Fullerton soils. The somewhat excessively drained Bodine and well drained Fullerton soils are in landscape positions similar to those of the Shack soil.

The Minvale and Shack soils are not suited to field crops because of the slope. They are moderately suited to hay and pasture.

The potential productivity of these soils for woodland is moderate. Loblolly pine and yellow poplar are the preferred trees to plant. Because these soils are moderately steep, the main management concerns are the hazard of erosion and the equipment limitation. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration can help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on these soils can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

These soils are poorly suited to most kinds of urban and recreational development because of the slope. Also, the moderate or moderately slow permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIe, and the woodland ordination symbol is 6R.

NaC—Nauvoo fine sandy loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on foot slopes and on the lower part of hillsides in the uplands. The depth to bedrock ranges from 40 to 60 inches. Slopes are smooth and convex.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 42 inches. The upper part is red sandy clay loam, and the lower part is red clay loam. Weathered sandstone bedrock is below a depth of 42 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen soils. These soils are in landscape positions similar to those of the Nauvoo soil.

The Nauvoo soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine, Virginia pine, shortleaf pine, yellow poplar, and sweetgum are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development because of the depth to bedrock and the slope. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 9A.

NaD—Nauvoo fine sandy loam, 10 to 15 percent slopes. This well drained, strongly sloping soil is on ridgetops and hillsides in the uplands. The depth to bedrock ranges from 40 to 60 inches. Slopes are smooth and convex.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The next layer also is brown fine sandy loam. It is about 3 inches thick. The subsoil extends to a depth of about 47 inches. The upper part is brown fine sandy loam and yellowish red clay loam, the next part is yellowish red clay loam that has brownish yellow mottles, and the lower part is mottled reddish, yellowish, and brownish loam. Weathered sandstone bedrock is below a depth of 47 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen and Tidings soils. These soils are in landscape positions similar to those of the Nauvoo soil.

The Nauvoo soil is poorly suited to field crops because of the slope. It is moderately suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected.

The potential productivity of this soil for woodland is moderate. Loblolly pine, Virginia pine, shortleaf pine, yellow poplar, and sweetgum are the preferred trees to

plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to most kinds of urban and recreational development because of the depth to bedrock and the slope. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 9A.

NaE—Nauvoo fine sandy loam, 15 to 35 percent slopes. This well drained, moderately steep and steep soil is on hillsides in the uplands. The depth to bedrock ranges from 40 to 60 inches. Slopes are smooth and convex.

Typically, the surface layer is dark reddish brown fine sandy loam about 3 inches thick. The next layer is also dark reddish brown fine sandy loam. It is about 2 inches thick. The subsoil extends to a depth of about 48 inches. The upper part is yellowish red sandy clay loam, the next part is red sandy clay loam, and the lower part is yellowish red loam. Weathered sandstone bedrock is below a depth of 48 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen and Tidings soils. These soils are in landscape positions similar to those of the Nauvoo soil.

The Nauvoo soil is not suited to field crops because of the slope. It is moderately suited to hay and pasture.

The potential productivity of this soil for woodland is moderate. Loblolly pine, Virginia pine, shortleaf pine, yellow poplar, and sweetgum are the preferred trees to plant. Because this soil is moderately steep, the main management concerns are the hazard of erosion and the equipment limitation. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation.

This soil is poorly suited to urban and recreational development because of the depth to bedrock and the slope. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIIe, and the woodland ordination symbol is 9R.

NeF—Nella stony fine sandy loam, 25 to 45 percent slopes, very stony. This well drained, steep soil is on foot slopes and hillsides in the uplands. Stones that are about 17 inches in diameter and 4 to 35 feet apart are on the surface. Slopes are smooth and convex.

Typically, the surface layer is brown stony fine sandy loam about 6 inches thick. The subsurface layer is light yellowish brown stony loam about 6 inches thick. The subsoil extends to a depth of 63 inches or more. It is stony clay loam and cobbly clay loam. The upper part is yellowish red, the next part is red and has brownish mottles, and the lower part is red and has brownish and reddish mottles.

Natural fertility and the content of organic matter are low. Permeability is moderate. Available water capacity also is moderate. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Allen, Nauvoo, Tidings, and Townley soils. These soils are in landscape positions similar to those of the Nella soil.

The Nella soil is not suited to field crops, hay, and pasture because of the slope and the stoniness of the surface layer.

The potential productivity of this soil for woodland is moderate. Shortleaf pine, Virginia pine, and loblolly pine are the preferred trees to plant. Because this soil is moderately steep, the equipment limitation is a management concern. Seedling mortality is an additional concern. Proper placement of access systems can help to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Planting at the proper depth can increase the rate of seedling survival.

This soil is poorly suited to urban and recreational development because of the slope. Also, the moderate permeability of the subsoil is a limitation on sites for septic tank absorption fields.

The capability subclass is VIIs, and the woodland ordination symbol is 3R.

RoA—Rome silt loam, 0 to 2 percent slopes, occasionally flooded. This well drained, nearly level soil is on low stream terraces. It is occasionally flooded from late fall to early spring.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown loam about 4 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part is yellowish brown clay loam that has strong brown mottles, the next part is yellowish brown clay loam that has brownish and reddish mottles, and the lower part is mottled brownish and reddish sandy clay loam.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Chenneby and Whitwell soils. The somewhat poorly drained Chenneby soils are on flood plains. The moderately well drained Whitwell soils are in landscape positions similar to those of the Rome soil.

The Rome soil is well suited to field crops, hay, and pasture. The flooding is a management concern.

The potential productivity of this soil for woodland is moderate. Yellow poplar, loblolly pine, Virginia pine, and black walnut are the preferred trees to plant. No significant limitations affect woodland.

This soil is only moderately suited to most kinds of recreational development. The flooding is the main concern. Generally, the effects of flooding can be overcome by special design and proper installation procedures. The flooding also severely limits the use of this soil as a site for urban development.

The capability subclass is IIw, and the woodland ordination symbol is 6A.

RoB—Rome silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is on stream terraces. Slopes are smooth and convex.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil to a depth of 60 inches or more is clay loam. The upper part is strong brown, and the lower part is brownish yellow.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is high. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Chenneby, Etowah, Holston, and Whitwell soils. The somewhat poorly drained Chenneby soils are on flood plains. Etowah and Holston soils and the moderately well drained Whitwell soils are in landscape positions similar to those of the Rome soil.

The Rome soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Yellow poplar, loblolly pine, Virginia pine, and black walnut are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is well suited to most kinds of urban and recreational development. The irrigation of lawns and gardens is limited by the slope.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

SmB—Shack-Minvale gravelly silt loams, 2 to 6 percent slopes. This map unit consists of moderately well drained and well drained, very gently sloping soils in the uplands. The Shack soil is on ridgetops and hillsides, and the Minvale soil is in low areas.

The Shack soil makes up about 55 percent of this map unit. Typically, the surface layer is dark grayish brown gravelly silt loam about 5 inches thick. The subsurface layer is light yellowish brown gravelly silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown gravelly silt loam and gravelly loam that has brownish and reddish mottles, the next part is mainly red gravelly silty clay loam that is dense and brittle, and the lower part is red gravelly silty clay loam that has brownish mottles.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderately slow in the brittle part of the subsoil. Available water capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the water table, which is at a depth of 2 to 4 feet in winter.

The Minvale soil makes up about 45 percent of this map unit. Typically, the surface layer is dark grayish brown gravelly silt loam about 5 inches thick. The subsurface layer is light yellowish brown gravelly silt loam about 9 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part is yellowish brown gravelly silt loam, the next part is strong brown gravelly silty clay loam, and the lower part is yellowish red gravelly clay.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate.

Available water capacity also is moderate. Tilth is good. The root zone is deep and can be easily penetrated by plant roots.

Included with these soils in mapping are a few small areas of Bodine, Cedarbluff, Fullerton, and Wax soils. Fullerton soils and the somewhat excessively drained Bodine soils are in landscape positions similar to those of the Shack and Minvale soils. Cedarbluff soils are in upland depressions. Wax soils are on foot slopes in the uplands.

The Shack and Minvale soils are well suited to field crops, hay, and pasture. Erosion is a hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of these soils for woodland is moderate. Yellow poplar and loblolly pine are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

These soils are well suited to most kinds of urban and recreational development. Wetness and small stones are management concerns in places. Also, the moderate or moderately slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IIe, and the woodland ordination symbol is 6A.

TaB—Talbott silt loam, 2 to 6 percent slopes. This well drained, very gently sloping soil is mainly on ridgetops in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are mostly smooth and convex.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 37 inches. It is predominantly red. The upper part is silty clay, and the lower part is clay. Limestone bedrock is at a depth of about 37 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderately slow. Available water capacity is low. Tilth is good. The effective root zone is limited by the underlying limestone bedrock at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Decatur and Lyerly soils. These soils are in landscape positions similar to those of the Talbott soil. Lyerly soils are well drained and moderately well drained.

The Talbott soil is well suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, Virginia pine, and eastern redcedar are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the moderately slow permeability of the subsoil and the depth to bedrock are limitations on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope and the depth to bedrock. The soil is only moderately suited to most kinds of recreational development because of the restricted permeability. Generally, this limitation can be overcome by special design and proper installation procedures.

The capability subclass is IIIe, and the woodland ordination symbol is 3A.

TaC—Talbott silt loam, 6 to 10 percent slopes. This well drained, gently sloping soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are mostly smooth and convex.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil is yellowish red silty clay and red clay about 30 inches thick. Limestone bedrock is at a depth of about 35 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderately slow. Available water capacity is low. Tilth is good. The effective root zone is limited by the underlying limestone bedrock at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Decatur and Lyerly soils. These soils are in landscape positions similar to those of the Talbott soil. Lyerly soils are well drained and moderately well drained.

The Talbott soil is only moderately suited to field crops. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, Virginia pine, and eastern redcedar are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the moderately slow permeability of the subsoil and the depth to bedrock are limitations on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope and the depth to bedrock. The soil is only moderately suited to most kinds of recreational development because of the slope and the restricted permeability. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 3A.

TbC2—Talbott silty clay loam, 6 to 10 percent slopes, eroded. This well drained, gently sloping soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is yellowish red silty clay loam about 4 inches thick. The subsoil extends to a depth of about 32 inches. The upper part is yellowish red silty clay loam, and the lower part is red clay. Limestone bedrock is at a depth of about 32 inches.

Natural fertility is medium, and the content of organic matter is low. Permeability is moderately slow. Available water capacity is low. Tilth is poor because of the eroded silty clay loam surface layer. The effective root zone is limited by the underlying limestone bedrock at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Decatur and Dewey soils. These soils are in landscape positions similar to those of the Talbott soil.

The Talbott soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, Virginia pine, and eastern redcedar are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the moderately slow permeability of the subsoil and the depth to bedrock are limitations on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope and the depth to bedrock. The soil is only moderately suited to most kinds of recreational development because of the slope and the restricted permeability. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 3A.

TbD2—Talbott silty clay loam, 10 to 15 percent slopes, eroded. This well drained, strongly sloping soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is yellowish red silty clay loam about 5 inches thick. The subsoil extends to a depth of about 37 inches. The upper part is yellowish red silty clay, and the lower part is red clay. Limestone bedrock is at a depth of about 37 inches.

Natural fertility is medium, and the content of organic matter is low. Permeability is moderately slow. Available water capacity is low. Tilth is poor because of the eroded silty clay loam surface layer. The effective root zone is limited by the underlying limestone bedrock at a depth of 20 to 40 inches.

Included with this soil in mapping are a few small areas of Decatur and Dewey soils. These soils are in landscape positions similar to those of the Talbott soil.

The Talbott soil is not suited to field crops because of the slope and the poor tilth. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated crops are grown. Including grasses in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Loblolly pine, shortleaf pine, Virginia pine, and eastern redcedar are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be minimized by harvesting and otherwise managing the woodland on the contour.

This soil is poorly suited to most urban uses mainly because of the depth to bedrock. Also, the moderately slow permeability of the subsoil and the depth to bedrock are limitations on sites for septic tank absorption fields. The irrigation of lawns and gardens is limited by the slope and the depth to bedrock. The soil is only moderately suited to most kinds of recreational development because of the slope and the restricted permeability. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is VIe, and the woodland ordination symbol is 3A.

TgG—Tidings-Gorgas complex, 45 to 70 percent slopes. This map unit consists of well drained, very steep soils on hillsides in the uplands. It is on the western hillside of Taylor Ridge. The depth to bedrock ranges from 10 to 60 inches.

The Tidings soil makes up about 60 percent of this map unit. Typically, the surface layer is dark brown and dark grayish brown gravelly loam about 6 inches thick. The subsoil extends to a depth of about 31 inches. The upper part is yellowish brown gravelly loam, and the lower part is yellowish brown gravelly clay loam that has yellowish mottles. The substratum to a depth of about 43 inches is yellowish brown and pale brown gravelly loam. It is underlain by shale bedrock.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is low. Tilth is good. The effective root zone is limited by the underlying bedrock.

The Gorgas soil makes up about 40 percent of this map unit. Typically, the surface layer is very dark grayish brown sandy loam about 2 inches thick. The subsoil extends to a depth of about 18 inches. It is yellowish brown gravelly loam. Hard sandstone bedrock is below a depth of 18 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderately rapid. Available water capacity is low. Tilth is good. The effective root zone is limited by the underlying bedrock.

Included with these soils in mapping are a few small areas of Allen, Nauvoo, and Nella soils. Also included are a few small areas of rock outcrop. Included areas are in landscape positions similar to those of the Tidings and Gorgas soils.

The Tidings and Gorgas soils are not suited to field crops, hay, and pasture because of the slope and the depth to bedrock.

These soils are mostly wooded. The potential productivity of these soils for woodland is moderate. Loblolly pine is the preferred tree to plant. Because these soils are very steep, the hazard of erosion and the equipment limitation are management concerns. Seedling mortality is an additional concern. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement and design of access systems help to overcome the equipment limitation. In addition, the need for the use of heavy equipment on these soils can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Planting at the proper depth can increase the rate of seedling survival.

These soils are poorly suited to most kinds of urban and recreational development because of the slope. Also, the depth to bedrock is a limitation on sites for septic tank absorption fields.

The capability subclass is VIIe. The woodland ordination symbol assigned to the Tidings soil is 8R, and that assigned to the Gorgas soil is 6R.

TmD—Tidings-Townley complex, 10 to 25 percent slopes. This map unit consists of soils that are well drained and strongly sloping and moderately steep. They are on ridgetops and hillsides in the uplands. The depth to bedrock ranges from 20 to 60 inches.

The Tidings soil makes up about 65 percent of this map unit. Typically, the surface layer is dark brown gravelly loam about 2 inches thick. The subsurface layer is dark grayish brown gravelly loam about 6 inches thick. The subsoil extends to a depth of about 31 inches. It is yellowish brown gravelly loam or gravelly clay loam. The substratum to a depth of about 43 inches is mottled brownish, yellowish, or grayish gravelly loam. It is underlain by weathered, interbedded shale and sandstone bedrock.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is low. Tilth is good. The effective root zone is limited by the underlying bedrock.

The Townley soil makes up about 35 percent of this map unit. Typically, the surface layer is light yellowish brown loam about 6 inches thick. The subsoil extends to a depth of about 27 inches. The upper part is yellowish red silty clay loam, and the lower part is yellowish red clay. Shale bedrock is below a depth of 27 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is fair. The effective root zone is limited by the underlying bedrock.

Included with these soils in mapping are a few small areas of Armuchee soils. These included soils are in landscape positions similar to those of the Tidings and Townley soils.

The Tidings and Townley soils are not suited to field crops. They are only poorly suited to hay and pasture because of the underlying bedrock.

These soils are mostly wooded. The potential productivity of these soils for woodland is moderate. Loblolly pine is the preferred tree to plant. Although no significant limitations affect woodland in most areas, the

hazard of erosion, the equipment limitation, and seedling mortality are management concerns in some areas. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement of access systems helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on these soils can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Planting at the proper depth can increase the rate of seedling survival.

These soils are poorly suited to most kinds of urban and recreational development because of the slope. Also, the depth to bedrock is a limitation on sites for septic tank absorption fields.

The capability subclass is VIe. The woodland ordination symbol assigned to the Tidings soil is 8A, and that assigned to the Townley soil is 6R.

TmF—Tidings-Townley complex, 25 to 45 percent slopes. This map unit consists of soils that are well drained and steep. They are on hillsides in the uplands. The depth to bedrock ranges from 20 to 60 inches.

The Tidings soil makes up about 65 percent of this map unit. Typically, the surface layer is dark brown gravelly loam about 2 inches thick. The subsurface layer is dark grayish brown gravelly loam about 6 inches thick. The subsoil extends to a depth of about 31 inches. It is yellowish brown gravelly loam in the upper part and yellowish brown gravelly clay loam in the lower part. The substratum to a depth of about 43 inches is yellowish brown and pale brown gravelly loam. Shale bedrock is at a depth of about 43 inches.

Natural fertility is low, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity is low. Tilth is good. The effective root zone is limited by the underlying shale.

The Townley soil makes up about 35 percent of this map unit. Typically, the surface layer is light yellowish brown loam about 5 inches thick. The subsoil extends to a depth of about 27 inches. The upper part is yellowish red silty clay, and the lower part is yellowish red clay. Shale bedrock is below a depth of 27 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is fair. The effective root zone is limited by the underlying shale.

Included with these soils in mapping are a few small areas of Armuchee soils. These included soils are in landscape positions similar to those of the Tidings and Townley soils.

The Tidings and Townley soils are not suited to field crops, hay, and pasture because of the depth to bedrock and the slope.

These soils are mostly wooded. The potential productivity of these soils for woodland is moderate. Loblolly pine is the preferred tree to plant. Because these soils are steep, the hazard of erosion and the equipment limitation are management concerns. Seedling mortality is an additional management concern. Harvesting and otherwise managing the woodland on the contour, establishing water bars in firebreaks, and properly locating skid trails can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement and design of access systems help to overcome the equipment limitation. In addition, the need for the use of heavy equipment on these soils can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Locating log decks near the top of the slope also helps to overcome the equipment limitation. Planting at the proper depth can increase the rate of seedling survival.

These soils are poorly suited to most kinds of urban and recreational development because of the slope. Also, the depth to bedrock is a limitation on sites for septic tank absorption fields.

The capability subclass is VIIe. The woodland ordination symbol assigned to the Tidings soil is 8R, and that assigned to the Townley soil is 6R.

TnC—Townley silt loam, 2 to 10 percent slopes. This well drained, very gently sloping and gently sloping soil is on ridgetops and hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are smooth and convex.

Typically, the surface layer is light yellowish brown silt loam about 6 inches thick. The subsoil extends to a depth of about 27 inches. The upper part is yellowish brown silty clay loam, and the lower part is strong brown clay. Shale bedrock is below a depth of 27 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is fair. The effective root zone is limited by the underlying shale.

Included with this soil in mapping are a few small areas of Armuchee and Tidings soils and soils that have shale bedrock at a depth of more than 40 inches. These

soils are in landscape positions similar to those of the Townley soil.

The Townley soil is only moderately suited to field crops because of the slope. It is well suited to hay and pasture. Erosion is a severe hazard if cultivated areas are not protected. A conservation tillage system, a water management system, or a combination of both helps to control runoff and erosion.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. In areas where equipment use is heavy, soil compaction is a management concern. In most areas, scheduling harvesting and other woodland management activities for the drier periods helps to keep compaction to a minimum. A chisel or subsoiler can promote revegetation in compacted areas.

This soil is only moderately suited to most urban uses because of the depth to bedrock and the shrink-swell potential. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields and most kinds of recreational development. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6C.

TnE—Townley silt loam, 10 to 25 percent slopes. This well drained, strongly sloping and moderately steep soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are irregular and convex.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 24 inches. The upper part is yellowish red silty clay and clay, and the lower part is yellowish red clay that has yellowish mottles. Weathered shale bedrock is below a depth of 24 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is fair. The effective root zone is limited by the underlying shale.

Included with this soil in mapping are a few small areas of Armuchee and Tidings soils. These soils are in landscape positions similar to those of the Townley soil.

The Townley soil is not suited to field crops because of the slope. It is moderately suited to hay and pasture.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. Because this soil is strongly sloping and moderately steep, the hazard of erosion and the equipment limitation are management concerns. Seedling mortality is an additional management concern. Harvesting and otherwise managing the woodland on the contour and establishing water bars in firebreaks can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement of access systems and log decks helps to overcome the equipment limitation. In addition, the need for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Planting at the proper depth can increase the rate of seedling survival.

This soil is poorly suited to most urban uses because of the depth to bedrock and the slope. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is poorly suited to most kinds of recreational development mainly because of the slope.

The capability subclass is VIe, and the woodland ordination symbol is 6R.

TnF—Townley silt loam, 25 to 45 percent slopes. This well drained, steep soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. Slopes are irregular and convex.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 30 inches. The upper part is yellowish red silty clay and clay, and the lower part is yellowish red clay that has yellowish mottles. Weathered shale bedrock is below a depth of 30 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is fair. The effective root zone is limited by the underlying shale.

Included with this soil in mapping are a few small areas of Armuchee and Tidings soils. These soils are in landscape positions similar to those of the Townley soil.

The Townley soil is not suited to field crops, hay, and pasture because of the slope.

This soil is mostly wooded. The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. Because this soil is steep, the hazard of erosion and the equipment limitation are management concerns. Seedling mortality is an additional management concern. Harvesting and otherwise managing the woodland on the contour and establishing water bars in firebreaks can effectively reduce the hazard of erosion. Scheduling harvesting activities for the drier periods and establishing a temporary ground cover during periods of regeneration help to keep erosion to a minimum. Proper placement of access systems and log decks helps to overcome the equipment limitation. In addition, the need

for the use of heavy equipment on this soil can be reduced if seedlings are planted by hand and if winching can be used to skid trees and logs during harvesting. Planting at the proper depth can increase the rate of seedling survival.

This soil is poorly suited to most urban uses because of the depth to bedrock and the slope. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The soil is poorly suited to most kinds of recreational development because of the slope.

The capability subclass is VIIe, and the woodland ordination symbol is 6R.

ToC2—Townley silty clay loam, 2 to 10 percent slopes, eroded. This well drained, very gently sloping and gently sloping soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is reddish yellow silty clay loam about 6 inches thick. The subsoil extends to a depth of about 29 inches. The upper part is yellowish red silty clay and clay, and the lower part is reddish yellow clay that has brownish mottles. Weathered shale bedrock is below a depth of 29 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is poor because of the silty clay loam surface layer. The effective root zone is limited by the underlying shale.

Included with this soil in mapping are a few small areas of Armuchee soils. These soils are in landscape positions similar to those of the Townley soil.

The Townley soil is poorly suited to field crops because of the poor tilth and the slope. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. The equipment limitation and seedling mortality are management concerns. Scheduling harvesting and other woodland management activities for the drier periods helps to keep soil compaction to a minimum. Proper planting procedures generally increase the rate of seedling survival. A chisel or subsoiler promotes quick revegetation in compacted areas and increases the rate of seedling survival.

This soil is only moderately suited to most urban uses because of the depth to bedrock and the shrink-swell potential. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields and for most kinds of recreational development. The irrigation of lawns and gardens is limited by the slope. Generally, these limitations can be overcome by special design and proper installation procedures.

The capability subclass is IVe, and the woodland ordination symbol is 6C.

ToE2—Townley silty clay loam, 10 to 25 percent slopes, eroded. This well drained, strongly sloping and moderately steep soil is on hillsides in the uplands. The depth to bedrock ranges from 20 to 40 inches. The surface layer is a mixture of the original surface soil and the upper part of the subsoil. Rills, galled spots, and gullies are common. Slopes are irregular and convex.

Typically, the surface layer is yellowish red silty clay loam about 6 inches thick. The subsoil extends to a depth of about 31 inches. The upper part is yellowish red silty clay, and the lower part is yellowish red clay that has brownish and yellowish mottles. Shale bedrock is below a depth of 31 inches.

Natural fertility and the content of organic matter are low. Permeability is slow. Available water capacity is low. Tilth is poor because of the silty clay loam surface layer. The root zone is limited by the underlying shale.

Included with this soil in mapping are a few small areas of Armuchee soils. These soils are in landscape positions similar to those of the Townley soil.

The Townley soil is not suited to field crops because of the poor tilth and the slope. It is moderately suited to hay and pasture. Further erosion is a severe hazard if cultivated crops are grown. Including grasses and legumes in the cropping system helps to control further erosion and reduces the runoff rate.

The potential productivity of this soil for woodland is moderate. Loblolly pine and Virginia pine are the preferred trees to plant. Because this soil is highly susceptible to erosion, the main management concern is the hazard of further erosion. The equipment limitation and seedling mortality are additional concerns. Harvesting and otherwise managing the woodland on the contour, leaving slash scattered rather than piled, seeding heavily used areas after harvest, and establishing erosion-control measures in firebreaks and during road construction can effectively reduce the hazard of further erosion. Scheduling harvesting and other woodland management activities for the drier periods helps to keep erosion within tolerable limits and minimizes soil compaction. Proper planting procedures generally increase the rate of seedling survival. A chisel or subsoiler promotes quick revegetation in compacted areas and can also increase the rate of seedling survival.

This soil is poorly suited to most urban uses mainly

because of the depth to bedrock and the slope. Also, the slow permeability of the subsoil is a limitation on sites for septic tank absorption fields. The irrigation of lawns and gardens and the use of this soil as a site for most kinds of recreational development are limited by the slope.

The capability subclass is VIe, and the woodland ordination symbol is 6R.

TpA—Tupelo silt loam, 0 to 2 percent slopes, rarely flooded. This somewhat poorly drained, nearly level soil is in depressions in the uplands and on stream terraces. The depth to bedrock ranges from 40 to 70 inches. The soil is subject to rare flooding from fall to early spring.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil extends to a depth of about 51 inches. The upper part is dark brown silty clay loam, the next part is light yellowish brown and yellowish brown clay that has grayish and olivish mottles, and the lower part is light olive gray and olive gray clay. Limestone bedrock is at a depth of about 51 inches.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is slow. Available water capacity is moderate. Tilth is good. The root zone is usually deep, but it is restricted from fall to early spring, when the water table is at a depth of 1 to 2 feet.

Included with this soil in mapping are a few small areas of Wax soils and soils that are occasionally flooded. The moderately well drained Wax soils are near drainageways. The soils that are occasionally flooded are on flood plains.

The Tupelo soil is only moderately suited to field crops, hay, and pasture because of wetness and flooding.

The potential productivity of this soil for woodland is moderate. Loblolly pine, southern red oak, American sycamore, and eastern cottonwood are the preferred trees to plant. The seasonal wetness limits the use of conventional equipment and increases the seedling mortality rate. The equipment limitation generally can be overcome by using modified equipment or by scheduling planting and harvesting activities during the drier periods. Improving drainage and controlling competing plants generally increase the rate of seedling survival.

This soil is poorly suited to most kinds of recreational development mainly because of wetness. The flooding, the wetness, and the shrink-swell potential severely limit the use of this soil as a site for urban development.

The capability subclass is IIw, and the woodland ordination symbol is 6W.

TuA—Tupelo silt loam, 0 to 2 percent slopes, frequently flooded. This somewhat poorly drained, nearly level soil is on low stream terraces. The depth to bedrock ranges from 40 to 70 inches. The soil is frequently flooded from fall to early spring.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil extends to a depth of 62 inches or more. The upper part is light yellowish brown loam, the next part is light yellowish brown and olive yellow silty clay loam that has grayish mottles, and the lower part is mottled brownish, yellowish, reddish, and grayish silty clay loam.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is slow. Available water capacity is moderate. Tilth is good. The root zone is usually deep, but it is restricted from fall to early spring, when the water table is at a depth of 1 to 2 feet.

Included with this soil in mapping are a few small areas of Capshaw, Chenneby, and Lyerly soils and areas of poorly drained soils. The well drained Capshaw soils and the well drained and moderately well drained Lyerly soils are in landscape positions similar to those of the Tupelo soil. Chenneby soils and the poorly drained soils are on flood plains.

The Tupelo soil is only moderately suited to field crops, hay, and pasture because of wetness and flooding.

The potential productivity of this soil for woodland is moderate. Loblolly pine, southern red oak, American sycamore, and eastern cottonwood are the preferred trees to plant. The seasonal wetness and flooding limit the use of conventional equipment and increase the seedling mortality rate. The equipment limitation generally can be overcome by using modified equipment or by scheduling planting and harvesting activities for the drier periods. Improving drainage and controlling competing plants can generally increase the rate of seedling survival.

This soil is poorly suited to most kinds of recreational development mainly because of wetness and flooding. The flooding, the wetness, and the shrink-swell potential severely limit the use of this soil as a site for urban development.

The capability subclass is IVw, and the woodland ordination symbol is 6W.

UpF—Udorthents-Pits complex, gently sloping to steep. This map unit consists of areas of Udorthents, which are well drained soil material, and Pits. It is mostly on the upland ridges that contain chert, but a few areas are near the larger streams and on foot slopes in the uplands. The slope is 6 to 45 percent.

Udorthents make up about 75 percent of this map

unit. These soils are mostly strongly sloping to steep. Typically, they are reddish and brownish, cherty clayey material to a depth of 6 feet or more.

Pits make up about 25 percent of this map unit. They are mainly in gently sloping areas, but the more sloping sides of the pits are steep.

Natural fertility and the content of organic matter are low in the Udorthents. Reaction is very strongly acid to medium acid. Permeability is moderately slow. Tilth is poor. The root zone is deep. These characteristics are variable in the areas of Pits.

Included in mapping are some small areas of stones and boulders and outcrops of limestone on ridgetops in the uplands.

Most areas of this map unit are either idle land or support loblolly pine. In most places the soils are poorly suited to the common cultivated crops. In some places the Udorthents are smoothed and used as sites for roads and buildings. The moderately slow permeability of the Udorthents is a limitation on sites for septic tank absorption fields. The more level areas of the Udorthents are moderately suited to most kinds of urban and recreational development. The slope and the moderately slow permeability of the Udorthents are the main limitations. Generally, these limitations can be overcome by special design and proper installation procedures.

No capability classification or woodland ordination symbol is assigned.

WaA—Wax loam, 0 to 2 percent slopes, occasionally flooded. This moderately well drained, nearly level soil is on foot slopes in the uplands and near drainageways. The depth to a dense layer ranges from 18 to 30 inches. The soil is occasionally flooded from winter to midspring.

Typically, the surface layer is brown loam about 7 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part is mainly yellowish brown clay loam. The lower part is very gravelly clay loam that is dense and brittle and is mainly mottled with brownish, grayish, reddish, and yellowish colors.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is slow in the brittle part of the subsoil. Available water capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the water table, which is at a depth of 1.5 to 3.0 feet from winter to midspring.

Included with this soil in mapping are a few small areas of the well drained Minvale and Shack soils in the uplands and Chenneby soils on flood plains. Also included, in the uplands, are well drained soils that have less chert in the subsoil than the Wax soil and that do not have a dense and brittle layer.

The Wax soil is only moderately suited to field crops, hay, and pasture because of the occasional flooding and the somewhat restricted effective root zone. Improving drainage can reduce the damage caused by flooding.

The potential productivity of this soil for woodland is moderate. Loblolly pine and yellow poplar are the preferred trees to plant. No significant limitations affect woodland.

This soil is only moderately suited to recreational development mainly because of flooding and wetness. Generally, the flooding and the wetness can be overcome by special design and proper installation procedures. The flooding and the wetness also severely limit the use of this soil as a site for urban development.

The capability subclass is IIw, and the woodland ordination symbol is 8A.

WaB—Wax loam, 2 to 6 percent slopes, rarely flooded. This moderately well drained, very gently sloping soil is on foot slopes in the uplands and near drainageways. The depth to a dense layer ranges from 18 to 30 inches. The soil is subject to rare flooding from winter to midspring. Slopes are smooth and convex.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is mainly yellowish brown silty clay loam that has brownish and grayish mottles. The lower part is very gravelly clay loam that is dense and brittle and is mottled with mainly brownish and grayish colors.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is slow in the brittle part of the subsoil. Available water capacity is low. Tilth is good. The effective root zone is somewhat restricted by the dense and brittle layer in the subsoil and by the water table, which is at a depth of 1.5 to 3.0 feet from winter to midspring.

Included with this soil in mapping are a few small areas of Ennis, Whitwell, and Shack soils. The well drained Ennis soils are on foot slopes. Whitwell soils are on stream terraces. Shack soils are in the uplands. Also included are soils that have a gravelly silt loam surface layer. These soils are in landscape positions similar to those of the Wax soil.

The Wax soil is only moderately suited to field crops, hay, and pasture. Erosion is a moderate hazard if cultivated areas are not protected. Also, the somewhat restricted effective root zone is a limitation.

The potential productivity of this soil for woodland is moderate. Loblolly pine and yellow poplar are the preferred trees to plant. Although no significant limitations affect woodland, erosion should be

minimized by harvesting and otherwise managing the woodland on the contour.

This soil is only moderately suited to recreational development mainly because of wetness. Generally, the effects of this limitation can be overcome by special design and proper installation procedures. The wetness severely limits the use of this soil as a site for urban development.

The capability subclass is IIe, and the woodland ordination symbol is 8A.

WhA—Whitwell loam, 1 to 3 percent slopes, occasionally flooded. This moderately well drained, nearly level and very gently sloping soil is on stream terraces. It is occasionally flooded from late fall to early spring.

Typically, the surface layer is dark brown loam about 7 inches thick. The next layer is brown loam about 5 inches thick. The subsoil extends to a depth of 63 inches or more. The upper part is dark yellowish brown clay loam, the next part is yellowish brown clay loam that has grayish mottles, and the lower part is yellowish brown loam that has brownish and grayish mottles.

Natural fertility is medium, and the content of organic matter is low or moderate. Permeability is moderate. Available water capacity also is moderate. Tilth is good. The root zone is usually deep, but it is restricted from late fall to early spring, when the water table is at a depth of 2 to 3 feet, or during occasional, very brief periods of flooding.

Included with this soil in mapping are a few small areas of the well drained Holston and Rome soils. These soils are in landscape positions similar to those of the Whitwell soil. Also included are a few small areas of Chenneby soils. These soils are on flood plains.

The Whitwell soil is well suited to field crops, hay, and pasture. Wetness is a management concern. A drainage system may be needed in most places.

The potential productivity of this soil for woodland is high. Loblolly pine and sweetgum are the preferred trees to plant. The seasonal wetness increases the seedling mortality rate. Improving the drainage system, controlling competing plants, and planting adapted trees generally increase the rate of seedling survival.

This soil is only moderately suited to most kinds of recreational development mainly because of flooding and wetness. The wetness and the flooding also severely limit the use of this soil as a site for urban development.

The capability subclass is IIw, and the woodland ordination symbol is 7W.

Important Farmland

In Catoosa County, some soils are important in the production of food, feed, fiber, forage, and oilseed crops.

The map units, or soils, that make up *prime farmland* and *additional farmland of statewide importance*, and the acreage of each, are listed in table 5. This list does not constitute a recommendation for a particular land use. The location of each map unit is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

The soils that are considered prime farmland are those that are best suited to food, feed, forage, fiber, and oilseed crops. The soil properties, growing season, and moisture supply are those needed for a well managed soil to produce sustained high yields of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

About 16,194 acres in Catoosa County, or about 16 percent of the total acreage, meets the soil requirements for prime farmland. (See table 5.) More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

Additional Farmland of Statewide Importance

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on additional farmland of statewide importance.

In Catoosa County, about 43,020 acres is additional farmland of statewide importance. (See table 5.) This farmland is an important part of the agricultural resource base in the county, but it does not meet the requirements for prime farmland. It is seasonally wet, cannot be easily cultivated, and is more erodible and generally less productive than prime farmland. The slope is 10 percent or less.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

James E. Dean, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified, the system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The most important management needs on most of the soils used for farming in Catoosa County are controlling water erosion, removing excess water, and maintaining good tilth and productivity. Most of the soils in the survey area are susceptible to erosion. The degree of erosion depends on the erodibility of the soil, the frequency and intensity of rainfall, the steepness and length of slopes, the kinds of crops grown, and the tillage system used.

Loss of the surface layer through erosion is damaging for two major reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Cunningham, Decatur, Dewey, Fullerton, Lyerly, Talbott, and Townley soils. Second, soil erosion on farmland results in the sedimentation of streams. Control of erosion minimizes this pollution and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion-control practices provide a protective surface cover, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods helps to maintain the productive capacity of the soil. On livestock farms, which require pasture and hay, including grass forage crops in the cropping system reduces the hazard of erosion on sloping land and improves tilth for the following crop.

Applying conservation tillage systems that leave adequate amounts of crop residue on the surface

increases the rate of water infiltration and reduces the runoff rate and the hazard of erosion. This practice can be used on most of the soils in Catoosa County. No-till planting is an important conservation practice. It can be used on most of the soils in the county.

Terraces and diversions reduce the length of slopes and the runoff rate and control concentrated waterflow. They are most practical on soils that have smooth and convex slopes, such as Cunningham, Decatur, Dewey, and Fullerton soils.

Contour farming or contour stripcropping is an effective erosion-control practice on soils that have smooth, relatively short, uniform slopes. Examples are Cunningham, Decatur, Dewey, Etowah, and Holston soils.

Information about the design of erosion-control practices for each kind of soil is available from local offices of the Soil Conservation Service.

Excess water is a limitation on some soils in Catoosa County. The type of drainage system needed depends on the soil and the kinds of crops grown. Cedarbluff, Chenneby, Ketona, and Tupelo soils are examples of poorly drained or somewhat poorly drained soils in the county.

Soil fertility is naturally low in most of the soils in the county. Plants respond well to applications of fertilizer and other management practices. The soils are naturally acid. Applications of ground limestone are needed to obtain high yields of legumes and other crops that grow best on nearly neutral soils. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the desired level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils with good tilth are granular and porous. Most of the soils used for crops in Catoosa County have a surface layer of silt loam that is low in content of organic matter. Tilth is generally good, but it has deteriorated in the eroded Allen, Cunningham, Decatur, Fullerton, Talbott, and Townley soils, in which the subsoil is exposed. Regular additions of crop residue, manure, and other organic material help to maintain or improve tilth.

Some of the more common crops that are suited to the soils and climate of Catoosa County are corn, soybeans, grain sorghum, and wheat. Improved bermudagrass and tall fescue are common pasture grasses. They grow well on moderately well drained, loamy or clayey soils. Somewhat poorly drained soils, which are seasonally wet, are best suited to tall fescue.

The latest information about growing specialty crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss. The fertilizer needs of specific soils can be determined by soil tests. General fertilizer recommendations for field crops are available in a circular published in 1976 *(5)*.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation

projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Gary L. Tyre, forester, Soil Conservation Service, helped prepare this section.

Although most counties in Georgia are heavily forested, woodland makes up less than half of the total acreage of Catoosa County. Slightly less than 50,000 acres in the county is commercial forest land. The loblolly-shortleaf pine forest type makes up about 7 percent of the commercial forest land; oak-hickory, about 64 percent; oak-pine, about 16 percent; and elm-ash-cottonwood, about 13 percent *(11)*.

The majority of the woodland in Catoosa County is privately owned. Small, private holdings make up about 90 percent of the ownership, and forest industry holdings make up only about 7 percent. The most significant management problems involve the privately owned woodland, where there is considerable potential for increased growth. Timber prices and the demand for timber are low in Catoosa County and offer little incentive for improved or intensive forest management.

The potential productivity of most of the soils in the county for woodland is moderate. Most areas are at least partially forested. Management concerns include seedling mortality, the hazard of erosion, and the equipment limitation. In areas of the very gently sloping to strongly sloping soils of the Lyerly-Talbott and Minvale-Fullerton general soil map units, the limitations affecting woodland are slight or moderate. In areas of the very gently sloping to moderately steep soils of the Townley-Cunningham-Conasauga general soil map unit and the moderately steep to very steep soils of the Minvale-Bodine-Fullerton general soil map unit, the limitations are moderate or severe. In areas of the strongly sloping to steep soils of the Townley-Tidings and Tidings-Nella general soil map units, the limitations are severe.

The nearly level and gently sloping soils of the Chenneby-Rome general soil map unit are commonly used for hay or pasture, but the potential productivity of these soils for woodland is high. Because these soils are subject to occasional flooding, the seedling mortality rate is high. Plant competition is strong in most areas. Intensive mechanical site preparation is not recommended because of the proximity to streams and the hazard of sedimentation.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate

determine the kinds of trees that can grow on a site.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 8 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

The *potential productivity* of *common trees* on a soil is expressed as a *site index.* Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey are based on published data *(3, 4, 7, 8, 10).*

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means that the soil can be expected to produce about 114 cubic feet or about 568 board feet per acre per year at the point where the mean annual increment culminates.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

Samuel B. Ward, district conservationist, Soil Conservation Service, helped prepare this section.

Recreational development is limited in some parts of Catoosa County by the slope, small stones, the depth to bedrock, restricted permeability, flooding, and wetness. However, the well drained, nearly level Emory soil and the very gently sloping Allen, Apison, Decatur, Dewey, Etowah, Holston, and Rome soils are well suited to playgrounds, campsites, picnic areas, parks, paths and trails, and golf courses.

Many farm ponds and several creeks provide opportunities for fishing, and wooded and cultivated areas in the county provide opportunities for hunting. Deer and squirrels are hunted in wooded areas on Taylor Ridge and east of Taylor Ridge, and doves are hunted in cultivated areas in the western part of the county.

In table 9, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The

surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Louis Justice, biologist, Soil Conservation Service, helped prepare this section.

Catoosa County generally is a rural environment that provides fairly good habitat for wildlife mainly in pastured and wooded areas. About 50,000 acres in the county is forested, and nearly 36,000 acres is used for crops or pasture. Fish and wildlife are important aspects of the county's recreational resources and contribute substantially to the economy of the survey area.

The major plants of importance to terrestrial wildlife include greenbrier, shrub and annual lespedezas, panicgrass, croton, ragweed, partridge pea, paspalum, tickclover, and sumac. The important overstory and understory plants are sweetgum, sycamore, blackgum, pine, oak, hickory, holly, blackberry, elderberry, hackberry, and maple. The domestic plants of importance to wildlife include corn, soybeans, and small grain.

Cropland and pasture interspersed with pine and hardwood forests provide habitat for white-tailed deer, mourning dove, raccoon, gray squirrel, opossum, fox, and other wildlife. Rabbit and bobwhite quail populations are good in areas that have suitable food and cover. Unmanaged pasture, old fields, young pine plantations, and thinned tracts of woodland produce numerous native woody and herbaceous plants that provide food and cover for deer, rabbit, fox, quail, and other wildlife. Restoring hedgerows, field borders, windbreaks, and oddly shaped areas in pastures and fields improves the habitat for wildlife. Also, retaining mast-producing trees, such as oaks, can improve the ability of pine plantations to support wildlife.

Land use trends in which urban development is increasing have resulted in extensive clearing of wooded areas. This urban growth has an adverse effect on fish and wildlife populations. In addition, many of the chemicals used to control pests can harm small birds and animals, particularly such game species as quail.

Wetland habitat supports waterfowl and a variety of furbearers, such as otter, beaver, bobcat, and raccoon. The best available wetland habitat is in the areas of bottom land hardwoods along West Chickamauga Creek, East Chickamauga Creek, South Chickamauga Creek, Little Chickamauga Creek, Peavine Creek, and Tiger Creek and along numerous beaver ponds.

Catoosa County has about 15,500 acres of forested wetlands, about 1,000 small ponds, 2 major lakes, and about 136 miles of streams. The streams drain into the Tennessee River system. Important freshwater sport fish include largemouth bass, crappie, channel catfish, bluegill, redear sunfish, striped bass, rainbow trout, and brook trout. Because of the fragile habitat requirements of fish, special efforts are needed to control water pollution from both point and nonpoint sources.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are

very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, lovegrass, lespedeza, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, and threeawn grass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are plum, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, and beaver.

Engineering

John P. McEvoy, Jr., agricultural engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock or to a cemented pan, the available

water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary

landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of

less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed

waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SM-SC.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated

sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change

of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons characteristic of soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils.

The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of chemical analysis of several typical pedons in the survey area are given in table 18 and the results of physical analysis in tables 19 and 20. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(14).*

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all materials less than 75 mm (3B1).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; 15 bar (4B2a).

Organic carbon—dichromate, ferrous sulfate titration (6A1c).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Acidity—hydrogen chloride (6H5a).

Cation-exchange capacity—sum of cations (5A3a).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5A8b).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Reaction (pH)—calcium chloride (8C1e).

Ratio to total clay—cation-exchange capacity (8D1), 15 bar (8D1).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(15)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Paleudults (*Pale*, meaning excessive development, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Paleudults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic Typic Paleudults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(13)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(15)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allen Series

The Allen series consists of well drained, moderately permeable soils in the uplands. These soils formed in colluvium weathered from sandstone and shale. The

slope is 2 to 25 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Allen soils are associated with Holston, Nauvoo, and Nella soils. Holston soils are on stream terraces and on foot slopes in the uplands. Nauvoo soils are in landscape positions similar to those of the Allen soils. Nella soils are on foot slopes and in other areas on uplands. Holston soils have hue of 7.5YR or yellower in the B horizon. Nauvoo soils have sandstone bedrock at a depth of 40 to 60 inches. Nella soils have 15 percent or more rock fragments throughout the profile.

Typical pedon of Allen silt loam, 6 to 10 percent slopes, 0.4 mile south on U.S. Highway 41 from the junction with Interstate Highway 75; 3.5 miles south on Bandy Road; west of roadcut:

A—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; about 2 percent gravel; strongly acid; abrupt smooth boundary.

BE—5 to 14 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable; many fine roots; 2 percent gravel; strongly acid; clear wavy boundary.

Bt1—14 to 22 inches; yellowish red (5YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; about 2 percent gravel; strongly acid; clear wavy boundary.

Bt2—22 to 52 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; few fine roots; about 2 percent gravel; strongly acid; gradual wavy boundary.

Bt3—52 to 96 inches; red (2.5YR 4/6) clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable and firm; few very fine roots; common clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—96 to 99 inches; red (2.5YR 4/6) sandy clay; many medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common clay films on faces of peds; strongly acid.

The solum is 60 or more inches thick. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 4 to 12 inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or clay loam.

The BE horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is fine sandy loam or loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Common or many brownish or yellowish mottles are in the lower part. The Bt horizon generally is clay loam or sandy clay loam, but in some pedons the range includes sandy clay or clay in the lower part.

Apison Series

The Apison series consists of well drained, moderately permeable soils in the uplands. These soils formed in loamy material weathered from shale or interbedded shale and sandstone. The depth to bedrock ranges from 20 to 40 inches. The slope is 2 to 10 percent. The soils are fine-loamy, siliceous, thermic Typic Hapludults.

Apison soils are associated with Cunningham, Tidings, and Townley soils. These associated soils are in landscape positions similar to those of the Apison soils. Cunningham and Townley soils have an argillic horizon that has hue of 7.5YR or redder and has a clayey particle-size class. Tidings soils have 15 to 35 percent gravel fragments.

Typical pedon of Apison loam, 2 to 6 percent slopes, about 6.5 miles south on Georgia Highway 151 from the junction with Interstate Highway 75; about 1.25 miles east to Hickory Grove Church; 0.2 mile north on Houston Valley Road; 100 feet west of road:

Ap—0 to 6 inches; dark brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine roots; about 2 percent gravel, by volume; strongly acid; clear smooth boundary.

BE—6 to 11 inches; brown (10YR 5/3) loam; weak fine subangular blocky structure; very friable; many fine roots; about 5 percent gravel, by volume; strongly acid; clear smooth boundary.

Bt1—11 to 20 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; about 5 percent gravel, by volume; very strongly acid; clear wavy boundary.

Bt2—20 to 31 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky and angular blocky structure; friable; few fine roots; common faint clay films on faces of peds; about 5 percent gravel; about 10 percent shale fragments; very strongly acid; clear wavy boundary.

Bt3—31 to 37 inches; mottled yellowish brown (10YR 5/6), pale brown (10YR 6/3), and dark brown

(7.5YR 4/4) clay loam; weak fine subangular blocky structure; friable; about 10 percent gravel; about 15 percent shale fragments; very strongly acid; gradual wavy boundary.

Cr—37 to 60 inches; shale bedrock that has interbedded sandstone.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap or A horizon is 5 to 8 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The BE horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It is loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 6. In some pedons it does not have mottles in the lower part. It is clay loam or silty clay loam.

Armuchee Series

The Armuchee series consists of well drained, moderately slowly permeable soils in the uplands. These soils formed in clayey material weathered from shale. The depth to bedrock ranges from 20 to 36 inches. The slope is 6 to 10 percent. The soils are clayey, mixed, thermic Ochreptic Hapludults.

Armuchee soils are associated with Cunningham and Townley soils. These associated soils are in landscape positions similar to those of the Armuchee soils. Cunningham and Townley soils are more slowly permeable than the Armuchee soils. Cunningham soils are 40 to 60 inches deep over soft shale bedrock.

Typical pedon of Armuchee channery silt loam, 6 to 10 percent slopes, 0.1 mile west of Nellie Head Baptist Church on Georgia Highway 2; 0.4 mile north on paved road; 500 feet west of road:

Ap—0 to 5 inches; dark brown (10YR 4/3) channery silt loam; weak fine granular structure; very friable; about 20 percent shale fragments; many fine roots; very strongly acid; abrupt wavy boundary.

Bt—5 to 13 inches; strong brown (7.5YR 5/6) channery silty clay; many medium distinct dark brown (10YR 4/3) mottles; about 30 percent shale fragments; common fine and medium roots; common faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—13 to 31 inches; mottled brownish yellow (10YR 6/6), yellowish red (5YR 5/8), and light brown (7.5YR 6/4) extremely channery silty clay; massive; about 65 percent shale fragments; few medium roots; very strongly acid; gradual wavy boundary.

Cr—31 to 48 inches; mottled yellowish, brownish, and grayish, highly weathered, noncalcareous shale.

The thickness of the solum ranges from 8 to 20 inches. The depth to bedrock ranges from 20 to 36 inches. The content of shale fragments ranges from 15 to 35 percent in the B horizon and from 40 to 80 percent in the C horizon. The fragments are mostly less than 2 inches in diameter, but a few range to 6 inches in diameter. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap or A horizon is 4 to 8 inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8.

In some pedons the C horizon has brownish, yellowish, reddish, or grayish mottles. It is extremely channery silty clay, extremely channery clay, very channery silty clay, or very channery clay. In some pedons the Cr horizon has brownish, yellowish, reddish, or grayish mottles.

Bodine Series

The Bodine series consists of somewhat excessively drained, moderately rapidly permeable soils in the uplands. These soils formed in material weathered from cherty limestone. The slope is 10 to 60 percent. The soils are loamy-skeletal, siliceous, thermic Typic Paleudults.

Bodine soils are associated with Fullerton, Minvale, and Shack soils. These associated soils are in landscape positions similar to those of the Bodine soils. They have less than 35 percent chert throughout the profile and are well drained. Also, Fullerton soils have more than 35 percent clay in the Bt horizon. Shack soils are brittle and dense in the B horizon.

Typical pedon of Bodine cobbly silt loam, 25 to 60 percent slopes, very stony, 0.8 mile southwest of the intersection of Georgia Highway 2 and Interstate Highway 75:

A—0 to 4 inches; dark grayish brown (10YR 4/2) cobbly silt loam; weak fine granular structure; slightly hard, very friable; about 24 percent chert fragments less than 10 inches in size and 10 percent chert fragments more than 10 inches in size; strongly acid; clear wavy boundary.

E—4 to 12 inches; pale brown (10YR 6/3) cobbly silt loam; weak medium granular structure; very friable; about 34 percent chert fragments; strongly acid; gradual wavy boundary.

BE—12 to 17 inches; light yellowish brown (10YR 6/4) very gravelly silt loam; weak fine subangular blocky structure; friable; about 45 percent chert fragments; strongly acid; clear wavy boundary.
Bt1—17 to 30 inches; yellowish brown (10YR 5/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; about 45 percent chert fragments; strongly acid; gradual wavy boundary.
Bt2—30 to 65 inches; strong brown (7.5YR 5/6) very gravelly silty clay loam; moderate medium subangular blocky structure; firm; about 50 percent chert fragments, 10 percent of which are more than 10 inches in diameter; very strongly acid.

The solum is more than 60 inches thick. The content of chert fragments 2 millimeters to 24 inches in diameter ranges from 35 to 60 percent throughout the profile. The soils are very strongly acid or strongly acid throughout the profile.

The A horizon is 2 to 5 inches thick. It has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The E horizon is 2 to 10 inches thick. It has hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

The Bt horizon has hue of 10YR to 5YR, value of 5 or 6, and chroma of 4 to 8. It is silty clay loam or silt loam in the fine-earth fraction.

Capshaw Series

The Capshaw series consists of moderately well drained, slowly permeable soils in the uplands. These soils formed in clayey sediments. The depth to bedrock ranges from 48 to more than 60 inches. The slope is 2 to 6 percent. The soils are fine, mixed, thermic Ultic Hapludalfs.

Capshaw soils are associated with Lyerly and Tupelo soils. Lyerly soils are in landscape positions similar to those of the Capshaw soils. Tupelo soils are in the uplands and on stream terraces and are somewhat poorly drained. The well drained and moderately well drained Lyerly soils have hard bedrock at a depth of 20 to 40 inches. They are very slowly permeable.

Typical pedon of Capshaw silt loam, 2 to 6 percent slopes, in Chickamauga National Military Park; 1.9 miles east of Reed's Bridge Road from the junction with U.S. Highway 27; 1.0 mile south on Jay's Mill Road; 75 feet west of road:

A—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.
Bt1—6 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine subangular blocky structure; friable; many fine roots; few dark accumulations of manganese; strongly acid; gradual wavy boundary.
Bt2—17 to 23 inches; yellowish brown (10YR 5/6) silty clay; common fine prominent light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; firm; common fine and medium roots; few distinct clay films on faces of peds; common dark accumulations of manganese; strongly acid; gradual wavy boundary.
Bt3—23 to 40 inches; yellowish brown (10YR 5/6) clay; common medium prominent light brownish gray (2.5Y 6/2) and yellowish red (5YR 5/6) mottles; weak medium angular blocky structure; very firm; few medium roots; many prominent clay films on faces of peds; common dark accumulations of manganese; strongly acid; gradual wavy boundary.
Bt4—40 to 52 inches; yellowish brown (10YR 5/4) clay; many medium distinct grayish brown (10YR 5/2) and many medium prominent red (2.5YR 5/8) mottles; weak medium angular blocky structure; very firm; many prominent clay films on faces of peds; many dark accumulations of manganese; medium acid; gradual wavy boundary.
C—52 to 60 inches; mottled yellowish brown (10YR 5/4), red (2.5YR 5/8), and grayish brown (10YR 5/2) clay; massive; very firm; many dark accumulations of manganese; slightly acid.
R—60 inches; limestone bedrock.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock ranges from 48 to more than 60 inches. The soils are medium acid or strongly acid in the solum and medium acid to mildly alkaline in the substratum.

The A horizon is 6 to 10 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 to 4.

The upper part of the Bt horizon is silty clay loam or silty clay. It has hue of 10YR, value of 5, and chroma of 4 to 6. Mottles that have chroma of 2 or less are within the upper 10 inches of this horizon. Also, few or common brownish or reddish mottles are below this depth. The lower part of the Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It has common or many grayish, brownish, or reddish mottles, or it is mottled with grayish, brownish, or reddish colors and has no dominant matrix colors. It is silty clay or clay.

In some pedons the C horizon has grayish, reddish, or brownish mottles. It is silty clay or clay.

Cedarbluff Series

The Cedarbluff series consists of somewhat poorly drained soils on stream terraces and in upland

depressions. These soils formed in alluvium weathered from sandstone and shale. Permeability is moderate in the upper part of the profile and slow in the lower part. The slope is 0 to 2 percent. The soils are fine-loamy, siliceous, thermic Fragiaquic Paleudults.

Cedarbluff soils are associated with Rome, Wax, and Whitwell soils. Rome and Whitwell soils are on stream terraces. The moderately well drained Wax soils are on the foot slopes of uplands and near drainageways. The well drained Rome and moderately well drained Whitwell soils are not dense and brittle in the subsoil.

Typical pedon of Cedarbluff loam, occasionally flooded, about 5.0 miles south on U.S. Highway 151 from the junction with Interstate Highway 75; 0.3 mile west on Jones Road; 200 feet north of road:

Ap—0 to 6 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; many fine roots; about 3 percent gravel; slightly acid; abrupt smooth boundary.

BE—6 to 10 inches; brown (10YR 5/3) loam; weak fine granular structure; very friable; common fine roots; few fine wormholes; about 10 percent gravel; slightly acid; clear smooth boundary.

Bt1—10 to 20 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine wormholes; about 3 percent gravel; few small dark brown accumulations of manganese; strongly acid; clear wavy boundary.

Bt2—20 to 30 inches; light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; common small dark brown accumulations of manganese; about 5 percent gravel; strongly acid; clear irregular boundary.

Btx—30 to 38 inches; mottled brown (10YR 5/3), yellowish brown (10YR 5/4), and light brownish gray (10YR 6/2) clay loam; moderate medium subangular blocky structure; firm; dense and brittle in 45 percent of the horizon, by volume; about 10 percent gravel; strongly acid; clear wavy boundary.

B't—38 to 62 inches; mottled brown (10YR 5/3), yellowish brown (10YR 5/4), and light brownish gray (10YR 6/2) clay loam; weak medium subangular blocky structure; friable; about 10 percent gravel; strongly acid.

The solum is 60 or more inches thick. Depth to the Btx horizon ranges from 24 to 36 inches. The soils are strongly acid, except for the surface layer and the upper part of the subsoil in limed areas.

The A horizon is 6 to 12 inches thick. It has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4.

The BE horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is silt loam or loam.

The Bt1 and Bt2 horizons have hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. The Bt2 horizon has few or common grayish or brownish mottles. It is clay loam or silty clay loam.

In some pedons the Btx horizon has grayish, brownish, yellowish, or reddish mottles. It is clay loam or silty clay loam. About 40 to 60 percent, by volume, of this horizon is dense and brittle.

In some pedons the B't horizon has grayish, brownish, yellowish, or reddish mottles. It is clay loam or silty clay loam.

Chenneby Series

The Chenneby series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. The slope is 0 to 2 percent. The soils are fine-silty, mixed, thermic Fluvaquentic Dystrochrepts.

Chenneby soils are associated with Rome and Whitwell soils. These associated soils are on stream terraces. The well drained Rome and moderately well drained Whitwell soils are in a fine-loamy family.

Typical pedon of Chenneby silt loam, occasionally flooded, 0.4 mile south on U.S. Highway 41 from the junction with Interstate Highway 75; 2.0 miles south on Bandy Road; 200 feet east of road and 50 feet north of East Chickamauga Creek:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; very friable; common fine roots; medium acid; gradual smooth boundary.

Bw1—9 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; gradual wavy boundary.

Bw2—22 to 38 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; few fine roots; strongly acid; gradual wavy boundary.

Bw3—38 to 44 inches; mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; firm; few fine roots; about 2 percent gravel; medium acid; gradual wavy boundary.

BC—44 to 60 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky

structure; firm; about 4 percent gravel; medium acid.

The thickness of the solum ranges from 40 to more than 60 inches. The soils are very strongly acid to medium acid throughout the profile.

The A horizon is 5 to 12 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 to 4.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4, or it is mottled throughout and has no dominant matrix colors. Mottles that have chroma of 2 or less are below a depth of 20 inches. This horizon is silt loam or silty clay loam.

The BC horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 3, or it is mottled with brownish, yellowish, or grayish colors. It is silt loam, silty clay loam, or silty clay.

Conasauga Series

The Conasauga series consists of moderately well drained, slowly permeable soils in the uplands. These soils formed in clayey material weathered from calcareous shale and limestone. The depth to bedrock ranges from 20 to 40 inches. The slope is 1 to 10 percent. The soils are fine, mixed, thermic Typic Hapludalfs.

Conasauga soils are associated with Cunningham and Lyerly soils. These associated soils are in landscape positions similar to those of the Conasauga soils. Cunningham soils are well drained and are 40 to 60 inches deep over soft bedrock. The well drained and moderately well drained Lyerly soils are underlain by limestone and have more than 60 percent clay in the control section.

Typical pedon of Conasauga silt loam, 1 to 6 percent slopes, 2.6 miles north of the Walker County line on Georgia Highway 151; 0.2 mile east on paved road toward Nickajack Gap and Taylor Ridge; 150 feet north of paved road:

Ap—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; about 3 percent gravel; many fine and medium roots; very strongly acid; clear smooth boundary.

AB—3 to 6 inches; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; about 5 percent gravel; many medium roots; very strongly acid; clear wavy boundary.

Bt1—6 to 13 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; about 3 percent gravel; few fine roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—13 to 25 inches; yellowish brown (10YR 5/6) silty clay; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; common faint clay films on faces of peds; few small highly weathered fragments of shale; very strongly acid; gradual wavy boundary.

Bt3—25 to 36 inches; mottled brownish yellow (10YR 6/6), strong brown (7.5YR 5/6), and pale brown (10YR 6/3) silty clay; weak medium angular blocky structure; very firm; common faint clay films on faces of peds; few small highly weathered fragments of shale; strongly acid; gradual wavy boundary.

Cr—36 to 60 inches; mottled yellowish, brownish, and grayish, highly weathered shale that has rock-controlled structure.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of shale fragments ranges from 0 to 5 percent throughout the profile. The fragments are mostly less than 2 inches in diameter, but a few range to 6 inches in diameter. The soils are medium acid to very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap or A horizon is 5 to 8 inches thick. It has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4.

The Bt horizon has hue of 10YR and value and chroma of 4 to 6, or it is mottled with yellowish or brownish colors in the lower part. The upper part of this horizon is silt loam or silty clay loam. The lower part is silty clay or clay.

Cunningham Series

The Cunningham series consists of well drained, slowly permeable soils in the uplands. These soils formed in material weathered from shale and interbedded shale and limestone. The depth to bedrock ranges from 40 to 60 inches. The slope is 2 to 15 percent. The soils are clayey, mixed, thermic Typic Hapludults.

Cunningham soils are associated with Conasauga and Townley soils. These associated soils are in landscape positions similar to those of the Cunningham soils. The moderately well drained Conasauga soils have a base saturation of 35 percent or more at a depth of about 50 inches below the top of the argillic horizon or above a paralithic contact. Townley soils are 20 to 40 inches deep over shale bedrock.

Typical pedon of Cunningham silt loam, 6 to 10 percent slopes, 1.9 miles south of Ringgold on U.S. Highway 41; 0.6 mile north on Cherokee Valley Road;

at edge of borrow pit 100 feet west of road:

Ap—0 to 7 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine roots; few pebbles; extremely acid; clear smooth boundary.
Bt1—7 to 13 inches; reddish yellow (7.5YR 6/6) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; strongly acid; clear wavy boundary.
Bt2—13 to 22 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; friable; few fine roots; many prominent clay films on faces of peds; strongly acid; gradual wavy boundary.
Bt3—22 to 36 inches; reddish yellow (7.5YR 6/6) and yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; few distinct clay films on faces of peds; few small gray fragments of shale; strongly acid; gradual wavy boundary.
BC—36 to 46 inches; reddish yellow (7.5YR 7/6) and yellowish red (5YR 5/6) gravelly silty clay; weak medium subangular blocky structure; firm; about 25 percent small weathered soft fragments of shale; strongly acid; gradual wavy boundary.
C—46 to 58 inches; reddish yellow (7.5YR 6/6) and yellowish red (5YR 5/6), weathered soft fragments of shale and siltstone; strongly acid.
Cr—58 to 60 inches; weathered shale bedrock.

The thickness of the solum ranges from 30 to more than 56 inches. The depth to consolidated shale bedrock ranges from 40 to 60 inches. The content of shale and sandstone fragments ranges from 3 to 12 percent in the A and B horizons and from 10 to 25 percent in the BC and C horizons. The soils are extremely acid to strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 5 to 7 inches thick. It has hue of 2.5Y to 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is typically silt loam, but in eroded areas it is silty clay loam.

The Bt1 and Bt2 horizons have hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8. They are loam, silty clay, or clay. The Bt3 horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is clay, silty clay, or silty clay loam.

Decatur Series

The Decatur series consists of well drained, moderately permeable soils in the uplands. These soils formed in material weathered from limestone. The slope is 2 to 15 percent. The soils are clayey, kaolinitic, thermic Rhodic Paleudults.

Decatur soils are associated with Dewey, Fullerton, Minvale, and Shack soils. These associated soils are in landscape positions similar to those of the Decatur soils. All of the associated soils except Dewey soils have 15 percent or more chert throughout the profile. Dewey and Fullerton soils are mainly red. Minvale and Shack soils are in a fine-loamy family. Also, Shack soils are dense and brittle in some parts of the subsoil.

Typical pedon of Decatur silt loam, 2 to 6 percent slopes, 0.8 mile north of Ringgold on U.S. Highway 41; 100 feet west of highway:

Ap—0 to 7 inches; dark reddish brown (2.5YR 3/4) silt loam; moderate medium angular blocky structure; friable; many very fine roots; strongly acid; abrupt wavy boundary.
Bt1—7 to 15 inches; dark red (2.5YR 3/6) silty clay; moderate and strong medium angular blocky structure; firm; few fine roots; few distinct clay films on faces of peds; few small pebbles; strongly acid; gradual wavy boundary.
Bt2—15 to 42 inches; dark red (10R 3/6) clay; moderate fine angular blocky structure; very firm; few fine roots; many prominent clay films on faces of peds; few small pebbles; very strongly acid; gradual wavy boundary.
Bt3—42 to 72 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm and very firm; few medium distinct strong brown (7.5YR 5/6) mottles; common distinct clay films on faces of peds; many small brownish yellow concretions; very strongly acid.

The solum is 72 or more inches thick. The content of chert fragments 2 millimeters to 3 inches in diameter ranges from 0 to 5 percent throughout the profile. The soils are very strongly acid to medium acid throughout the profile.

The A horizon is 3 to 10 inches thick. It has hue of 2.5YR or 5YR, value of 2 or 3, and chroma of 2 to 4. It is typically silt loam, but in eroded areas it is silty clay loam.

The Bt horizon has hue of 2.5YR or 10R, value of 3, and chroma of 4 to 6. The upper part is silty clay loam or silty clay, and the lower part is silty clay or clay.

Dewey Series

The Dewey series consists of well drained, moderately permeable soils in the uplands. These soils formed in material weathered from limestone. The slope

is 2 to 10 percent. The soils are clayey, kaolinitic, thermic Typic Paleudults.

Dewey soils are associated with Decatur, Fullerton, Minvale, and Shack soils. These associated soils are in landscape positions similar to those of the Dewey soils. All of the associated soils except Decatur soils have 15 percent or more chert fragments throughout the profile. Decatur soils are rhodic. Fullerton soils are mainly red. Minvale and Shack soils are in a fine-loamy family. Also, Shack soils are dense and brittle in some parts of the subsoil.

Typical pedon of Dewey silt loam, 2 to 6 percent slopes, 0.7 mile north of Ringgold on U.S. Highway 41; 300 feet northwest of highway:

Ap—0 to 10 inches; dark reddish brown (5YR 3/3) silt loam; weak fine granular structure; friable; common fine roots; about 2 percent small chert fragments; neutral; abrupt smooth boundary.

Bt1—10 to 28 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; about 2 percent small chert fragments; slightly acid; clear wavy boundary.

Bt2—28 to 37 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable; few fine roots and pores; about 10 percent small chert pebbles; many clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—37 to 62 inches; red (2.5YR 4/6) clay; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common prominent clay films on faces of peds; few small black concretions; about 15 percent small chert fragments; strongly acid.

The solum is 60 or more inches thick. The content of chert fragments 2 millimeters to 3 inches in diameter ranges from 0 to 15 percent throughout the profile. The soils generally are strongly acid or very strongly acid throughout the profile, but the upper part is less acid.

The A horizon is 4 to 10 inches thick. It has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4.

The upper part of the Bt horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 to 6. The lower part has hue of 2.5YR or 5YR, value of 4, and chroma of 6 to 8. The upper part is silty clay loam, silty clay, or clay, and the lower part is silty clay or clay.

Emory Series

The Emory series consists of well drained, moderately permeable soils near streams and on foot slopes and in depressions in the uplands. These soils formed mainly in loamy sediments. The slope is 0 to 3 percent. The soils are fine-silty, siliceous, thermic Fluventic Umbric Dystrochrepts.

Emory soils are associated with Decatur, Dewey, and Fullerton soils. These associated soils are in a clayey family. They are in the uplands.

Typical pedon of Emory silt loam, 0.2 mile south on Georgia Highway 151 from the junction with U.S. Highway 41 in Ringgold; 200 feet west of highway:

Ap—0 to 10 inches; dark reddish brown (5YR 3/4) silt loam; weak fine granular structure; very friable; many very fine roots; common pores; strongly acid; abrupt smooth boundary.

Bw—10 to 22 inches; dark reddish brown (5YR 3/4) silt loam; weak fine subangular blocky structure; friable; common fine roots; strongly acid; gradual wavy boundary.

Ab—22 to 30 inches; dark reddish brown (5YR 3/2) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; clear wavy boundary.

Btb1—30 to 38 inches; dark reddish brown (5YR 3/4) silty clay loam; weak medium subangular blocky structure; friable; common very fine roots; few fine pores; strongly acid; gradual wavy boundary.

Btb2—38 to 62 inches; dark red (2.5YR 3/6) silty clay; moderate medium subangular blocky structure; friable; common fine black accumulations of manganese; strongly acid.

The recent local alluvium ranges from 20 to 36 inches deep over the buried horizons. The soils are strongly acid or medium acid throughout the profile, except for the surface layer in limed areas.

The Ap horizon is 7 to 10 inches thick. It has hue of 2.5YR or 5YR, value of 3, and chroma of 2 to 4.

The Bw horizon is 10 to 26 inches thick. It has hue of 5YR, value of 3 to 5, and chroma of 3 or 4. It is silt loam or silty clay loam.

The Ab horizon has hue of 5YR, value of 3 or 4, and chroma of 2 to 6. It is silt loam or silty clay loam.

The Btb horizon has hue of 10YR to 2.5YR, value of 3 to 5, and chroma of 2 to 4. It is silty clay loam, silty clay, loam, or clay loam.

Ennis Series

The Ennis series consists of well drained, moderately rapidly permeable soils on flood plains and on foot slopes and in depressions in the uplands. These soils formed mainly in loamy sediments. The slope is 0 to 3 percent. The soils are fine-loamy, siliceous, thermic Fluventic Dystrochrepts.

Ennis soils are associated with Fullerton, Minvale,

and Shack soils. These associated soils are in the uplands. They have argillic horizons. Also, Shack soils are brittle in the subsoil.

Typical pedon of Ennis gravelly silt loam, 0 to 3 percent slopes, occasionally flooded, 0.9 mile south on Georgia Highway 151 from the intersection with Interstate Highway 75; 100 feet east of highway:

Ap—0 to 9 inches; grayish brown (10YR 5/2) gravelly silt loam; moderate medium granular structure; very friable; many very fine and medium roots; about 25 percent chert fragments; medium acid; clear smooth boundary.

Bw1—9 to 24 inches; yellowish brown (10YR 5/6) gravelly loam; weak fine subangular blocky structure; friable; about 30 percent chert fragments; common fine roots; medium acid; clear smooth boundary.

Bw2—24 to 36 inches; yellowish brown (10YR 5/6) gravelly silt loam; common medium distinct pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; common fine roots; about 30 percent chert fragments; medium acid; clear wavy boundary.

C1—36 to 41 inches; yellowish brown (10YR 5/4) gravelly loam; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; massive; friable; about 35 percent chert fragments; strongly acid; gradual wavy boundary.

C2—41 to 63 inches; mottled pale brown (10YR 6/3), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/8) gravelly silty clay loam; massive; friable and firm; about 35 percent chert fragments; strongly acid.

The thickness of the solum ranges from 34 to more than 60 inches. The content of chert fragments ranges from 15 to 35 percent throughout the profile. The soils are very strongly acid to medium acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 4 to 9 inches thick. It has hue of 10YR, value of 2 to 5, and chroma of 2 to 4.

The Bw horizon is 20 to 40 inches thick. It has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. It is gravelly loam, gravelly silt loam, or gravelly clay loam.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is mottled in some pedons. It is gravelly silt loam, very gravelly silt loam, gravelly loam, or gravelly silty clay loam.

Etowah Series

The Etowah series consists of well drained, moderately permeable soils on stream terraces and on foot slopes in the uplands. These soils formed in loamy sediments. The slope is 2 to 10 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Etowah soils are associated with Allen, Holston, and Rome soils. Allen soils are in the uplands. Holston soils are in landscape positions similar to those of the Etowah soils. Rome soils are on stream terraces. All of the associated soils have an A horizon that has value of 4 or more. Also, Holston soils have a Bt horizon that has hue of 7.5YR or yellower. Rome soils have more sand in the lower part of the Bt horizon than the Etowah soils.

Typical pedon of Etowah loam, 2 to 6 percent slopes, 2.0 miles south of the Tennessee state line on Georgia Highway 151; 0.4 mile west on county road; 100 feet north of road:

Ap—0 to 8 inches; dark reddish brown (5YR 3/4) loam; weak fine granular structure; very friable; many fine roots; few wormcasts; medium acid; clear smooth boundary.

Bt1—8 to 13 inches; reddish brown (5YR 4/4) silt clay loam; weak medium subangular blocky structure; very friable; common fine and few medium roots; strongly acid; gradual smooth boundary.

Bt2—13 to 36 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few medium roots; common distinct clay films on faces of peds; few chert pebbles; strongly acid; gradual smooth boundary.

Bt3—36 to 52 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few medium roots; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—52 to 60 inches; strong brown (7.5YR 5/8) clay loam; many medium prominent yellow (10YR 7/6) mottles; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid.

The solum is 60 or more inches thick. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap horizon is 5 to 10 inches thick. It has hue of 10YR to 5YR, value of 3 or 4, and chroma of 2 to 4.

The Bt1 horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam, loam, silty clay loam, or clay loam.

The Bt2 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam or clay loam.

The Bt3 and Bt4 horizons have hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. They are

silty clay loam or clay loam. Few to many reddish, brownish, or yellowish mottles are in the Bt4 horizon.

Fullerton Series

The Fullerton series consists of well drained, moderately permeable soils in the uplands. These soils formed in material weathered from cherty limestone. The slope is 2 to 40 percent. The soils are clayey, kaolinitic, thermic Typic Paleudults.

Fullerton soils are associated with Bodine, Ennis, Minvale, Shack, and Wax soils. Bodine, Minvale, and Shack soils are in landscape positions similar to those of the Fullerton soils. Ennis soils are on flood plains and on foot slopes and in depressions in the uplands. Wax soils are on the foot slopes of uplands and near drainageways. Bodine soils have 35 percent or more chert fragments in the Bt horizon and are somewhat excessively drained. Ennis, Minvale, Shack, and Wax soils are in a fine-loamy family. Also, Ennis soils do not have an argillic horizon. Shack and Wax soils are dense and brittle in the Bt horizon.

Typical pedon of Fullerton gravelly silt loam, 15 to 40 percent slopes, 1,000 feet south on Interstate Highway 75 from the junction with Georgia Highway 146; directly northeast of Pine Grove Cemetery:

A—0 to 6 inches; brown (10YR 5/3) gravelly silt loam; weak fine granular structure; very friable; many fine and medium roots; about 21 percent chert fragments; slightly acid; abrupt smooth boundary.

Bt1—6 to 10 inches; strong brown (7.5YR 5/8) gravelly silty clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; about 21 percent chert fragments; strongly acid; clear smooth boundary.

Bt2—10 to 24 inches; red (2.5YR 4/6) gravelly clay; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; about 21 percent chert fragments 2 to 25 centimeters in size; strongly acid; gradual wavy boundary.

Bt3—24 to 48 inches; red (2.5YR 4/8) gravelly clay; moderate medium subangular blocky structure; firm; few fine roots; many prominent clay films on faces of peds; about 25 percent chert fragments; strongly acid; gradual wavy boundary.

Bt4—48 to 68 inches; red (2.5YR 5/6) gravelly clay; common fine and medium prominent reddish yellow (7.5YR 6/8) mottles; moderate medium angular and subangular blocky structure; firm; common prominent clay films on faces of peds; about 21 percent chert fragments; strongly acid; gradual wavy boundary.

Bt5—68 to 99 inches; yellowish red (5YR 5/8) gravelly clay; common fine and medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium angular and subangular blocky structure; firm; about 21 percent chert fragments; strongly acid.

The solum is 60 or more inches thick. The content of chert fragments ranges from 20 to 35 percent throughout the profile. The chert fragments are mostly less than 3 inches in diameter, but a few are as much as 40 inches in diameter. The soils are very strongly acid or strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 3 to 6 inches thick. It has hue of 10YR, value of 3 to 6, and chroma of 2 to 4. In eroded areas the Ap horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is gravelly silty clay loam.

Some gravelly silt loam pedons have an E horizon that is 2 to 8 inches thick. This horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6.

The Bt1 horizon has hue of 7.5YR to 2.5YR, value of 4 to 6, and chroma of 4 to 8. It is gravelly silty clay loam, gravelly silty clay, or gravelly clay loam.

The Bt2 and Bt3 horizons have hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 6 to 8. They are gravelly silty clay or gravelly clay.

The Bt4 and Bt5 horizons have hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. They have few to many reddish or brownish mottles. They are gravelly silty clay or gravelly clay.

Gorgas Series

The Gorgas series consists of well drained, moderately rapidly permeable soils in the uplands. These soils formed in material weathered from sandstone and interbedded sandstone and shale. The depth to bedrock ranges from 10 to 20 inches. The slope is 45 to 70 percent. The soils are loamy, siliceous, thermic Lithic Hapludults.

Gorgas soils are associated with Nauvoo and Tidings soils. These associated soils are in landscape positions similar to those of the Gorgas soils. They are 40 to 60 inches deep over bedrock. Also, Nauvoo soils have a Bt horizon that has hue of 5YR or redder.

Typical pedon of Gorgas sandy loam, in an area of Tidings-Gorgas complex, 45 to 70 percent slopes; 2.6 miles north of the Walker County line on Georgia Highway 151; 0.5 mile generally northeast on paved road; 1,000 feet south on top of the ridge that separates Catoosa County and Whitfield County; 500 feet west on the side of Taylor Ridge:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; many fine roots; about 10 percent small fragments of sandstone; strongly acid; abrupt wavy boundary.
Bt—2 to 18 inches; yellowish brown (10YR 5/6) gravelly loam; weak fine subangular blocky structure; very friable; fine and medium roots; about 25 percent small fragments of sandstone; common faint clay films on faces of peds; very strongly acid; gradual wavy boundary.
R—18 inches; hard sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. The content of sandstone fragments ranges from 10 to 15 percent in the surface layer and from 10 to 35 percent in the subsoil. The soils are strongly acid or very strongly acid throughout the profile.

The A horizon is 2 to 6 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 or 3.

The Bt horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. It is loam, fine sandy loam, or the gravelly analogs of those textures.

Holston Series

The Holston series consists of well drained, moderately permeable soils on stream terraces and on foot slopes in the uplands. These soils formed in loamy sediments weathered from sandstone. The slope is 2 to 10 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Holston soils are associated with Allen, Rome, and Whitwell soils. Allen soils are in the uplands. Rome and Whitwell soils are on stream terraces. Allen soils have hue of 5YR or redder in the B horizon. The content of clay in the Rome soils decreases by more than 20 percent at a depth of about 60 inches. Whitwell soils are moderately well drained.

Typical pedon of Holston fine sandy loam, 2 to 6 percent slopes, 0.5 mile north of the Whitfield County line on Houston Valley Road; 100 feet east of road:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; about 3 percent gravel; strongly acid; gradual smooth boundary.
Bt1—7 to 11 inches; yellowish brown (10YR 5/4) loam; weak medium granular structure; very friable; many fine and medium roots; about 3 percent gravel; strongly acid; gradual smooth boundary.
Bt2—11 to 22 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; friable; common medium roots; few faint clay films on faces of peds; about 5 percent gravel; strongly acid; gradual smooth boundary.
Bt3—22 to 37 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few medium roots; common faint clay films on faces of peds; about 10 percent gravel; very strongly acid; gradual wavy boundary.
Bt4—37 to 62 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and red (2.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; very strongly acid.

The solum is 62 or more inches thick. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 4 to 8 inches thick. It has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4.

The Bt1 horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 3 to 6. It is loam or sandy clay loam.

The Bt2 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The Bt3 and Bt4 horizons have hue of 10YR to 5YR, value of 5 or 6, and chroma of 6 to 8. They have few to many reddish, brownish, or yellowish mottles, or they are mottled with reddish, brownish, or yellowish colors and have no dominant matrix colors. They are sandy clay loam or clay loam.

Ketona Series

The Ketona series consists of poorly drained, slowly permeable soils on flood plains. These soils formed mainly in clayey sediments. The slope is 0 to 2 percent. The soils are fine, mixed, thermic Vertic Ochraqualfs.

Ketona soils are associated with Chenneby, Rome, and Whitwell soils. Chenneby soils are in landscape positions similar to those of the Ketona soils. Rome and Whitwell soils are on stream terraces. The somewhat poorly drained Chenneby soils are in a fine-silty family. The well drained Rome and moderately well drained Whitwell soils are in a fine-loamy family.

Typical pedon of Ketona silty clay loam, frequently flooded, 0.4 mile south on U.S. Highway 41 from the junction with Interstate Highway 75; 2.6 miles south on Bandy Road; 0.2 mile east on field road to dead end of field road; 100 feet south of field road:

Ap—0 to 10 inches; dark brown (10YR 4/3) silty clay loam; few medium distinct light brownish gray

(10YR 6/2) mottles; weak fine granular structure; friable; many fine roots; few wormcasts; neutral; abrupt smooth boundary.

Btg1—10 to 36 inches; gray (10YR 6/1) clay; common medium prominent light yellowish brown (2.5Y 6/4) mottles; firm; common fine roots; common distinct clay films on faces of peds; few wormcasts; neutral; clear wavy boundary.

Btg2—36 to 50 inches; light brownish gray (10YR 6/2) clay; common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; many prominent clay films on faces of peds; about 10 percent soft black accumulations; neutral; gradual wavy boundary.

Btg3—50 to 76 inches; light brownish gray (10YR 6/2) clay; many coarse prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds.

The solum is 60 or more inches thick. The soils are slightly acid to moderately alkaline throughout the profile.

The A horizon is 6 to 10 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. In pedons where value is 3, the A horizon is 4 to 7 inches thick. Grayish mottles are within a depth of 10 inches.

The Btg horizon has hue of 5Y to 7.5YR, value of 4 to 6, and chroma 1 or 2, or it is neutral in hue and has value of 4 to 6. It has few to many brownish or yellowish mottles. It is silty clay or clay.

Lyerly Series

The Lyerly series consists of well drained and moderately well drained, very slowly permeable soils in the uplands. These soils formed in material weathered from limestone. The depth to bedrock ranges from 20 to 40 inches. The slope is 2 to 10 percent. The soils are very fine, mixed, thermic Vertic Hapludalfs.

Lyerly soils are associated with Conasauga, Minvale, Rome, Shack, and Townley soils. Conasauga, Minvale, Shack, and Townley soils are in landscape positions similar to those of the Lyerly soils. Rome soils are on stream terraces. All of the associated soils have less than 60 percent clay in the upper 20 inches of the argillic horizon. Also, Conasauga and Townley soils are dominantly underlain by shale. Minvale and Shack soils have 15 percent or more chert fragments throughout the solum. Minvale, Rome, and Shack soils are more than 60 inches deep over bedrock.

Typical pedon of Lyerly silty clay loam, 2 to 6 percent slopes, 4.3 miles east of Chickamauga National Military Park Museum on paved road to Boynton; 0.3 mile west of Boynton School; 0.4 mile north on dead end road; 800 feet east of road and 250 feet north of drain:

Ap—0 to 6 inches; brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; friable; many fine roots; few wormcasts; slightly acid; clear smooth boundary.

Bt1—6 to 14 inches; yellowish brown (10YR 5/6) clay; few fine prominent yellowish red (5YR 5/6) mottles; moderate medium blocky structure; firm; plastic; common fine and few medium roots; common distinct clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt2—14 to 20 inches; light olive brown (2.5Y 5/4) clay; strong medium blocky structure; grooved intersecting natural peds; firm; plastic; few medium roots; many prominent clay films on faces of peds; slightly acid; abrupt smooth boundary.

BC—20 to 24 inches; light olive brown (2.5Y 5/4) clay; common medium distinct olive (5Y 5/3) and few coarse distinct pale yellow (5Y 7/3) mottles; weak medium blocky structure; grooved intersecting natural peds; very firm; very plastic; few medium roots; many fine and medium shiny surfaces on peds; few fine black concretions; few dark soft accumulations; few fine calcium carbonate concretions; neutral.

R—24 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The Ap and Bt horizons range from slightly acid to strongly acid, and the BC horizon is slightly acid or neutral.

The Ap horizon is 3 to 7 inches thick. It has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 5Y to 10YR, value of 5 or 6, and chroma of 4 to 8. It has few to many yellowish, brownish, reddish, or grayish mottles. In some pedons mottles that have chroma of 2 or less are within the upper 27 to 33 inches of the Bt horizon. This horizon is clay or silty clay and has 60 to 75 percent clay in the particle-size control section.

The BC horizon and the C horizon, if it occurs, have colors similar to those of the Bt horizon. Some pedons have few to many reddish, brownish, or grayish mottles. Concretions are few or common. Limestone fragments are few or common in some pedons. The BC horizon is clay or silty clay.

Minvale Series

The Minvale series consists of well drained, moderately permeable soils in the uplands. These soils

formed in sediments washed from soils that formed in material weathered from cherty limestone. They are oriented in a northeast-southwest direction. The slope is 2 to 25 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Minvale soils are associated with Bodine, Cedarbluff, Ennis, Fullerton, Shack, and Wax soils. Bodine, Fullerton, and Shack soils are in landscape positions similar to those of the Minvale soils. Bodine soils have 34 percent or more chert fragments and are somewhat excessively drained. Fullerton soils have more than 35 percent clay in the Bt horizon. Cedarbluff, Shack, and Wax soils are dense and brittle in the B horizon. Cedarbluff and Wax soils are lower on the landscape than the Minvale soils. Ennis soils do not have an argillic horizon. They are primarily on flood plains.

Typical pedon of Minvale gravelly silt loam, in an area of Minvale-Shack gravelly silt loams, 15 to 25 percent slopes; 1.3 miles south of Boynton; west of paved road:

A—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly silt loam; moderate medium granular structure; friable; many fine and medium roots; about 15 percent chert fragments; strongly acid; clear smooth boundary.

E—5 to 14 inches; light yellowish brown (10YR 6/4) gravelly silt loam; moderate medium granular structure; friable; common fine and medium roots; about 20 percent chert fragments; strongly acid; clear wavy boundary.

BE—14 to 19 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak medium subangular blocky structure; friable; about 20 percent chert fragments; strongly acid; clear wavy boundary.

Bt1—19 to 48 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; moderate medium subangular blocky structure; firm; about 32 percent chert fragments 2 to 25 centimeters in size; strongly acid; gradual wavy boundary.

Bt2—48 to 65 inches; yellowish red (5YR 5/6) gravelly clay; moderate medium subangular blocky structure; firm; about 20 percent chert fragments; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The content of chert fragments ranges from 15 to 35 percent throughout the profile. The coarse fragments are mostly less than 3 inches in diameter, but a few range to 40 inches in diameter. The soils are strongly acid or very strongly acid throughout the profile.

The A or Ap horizon is 5 to 10 inches thick. It has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4.

The E horizon is less than 10 inches thick. It has hue of 10YR or 2.5Y and value and chroma of 4 to 6.

The BE horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8.

The Bt horizon has hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 4 to 8. It is gravelly silty clay loam or gravelly clay. The average content of clay in the upper 20 inches of the horizon is 20 to 35 percent. The content of fine to coarse sand is less than 20 percent. The content of coarse fragments ranges from 15 to 35 percent.

Nauvoo Series

The Nauvoo series consists of well drained, moderately permeable soils in the uplands. These soils formed in material weathered from sandstone and shale. The depth to bedrock ranges from 40 to 60 inches. The slope is 6 to 35 percent. The soils are fine-loamy, siliceous, thermic Typic Hapludults.

Nauvoo soils are associated with Allen and Nella soils. Allen soils are in landscape positions similar to those of the Nauvoo soils. Nella soils are on foot slopes and in other areas on uplands. Allen soils are more than 60 inches deep over bedrock. Nella soils have 15 to 35 percent rock fragments throughout the profile.

Typical pedon of Nauvoo fine sandy loam, 10 to 15 percent slopes, 2.0 miles north of Hickory Grove Church on the Whitfield County line; 0.9 mile northwest on gravel road towards Taylor Ridge; 500 feet west of road:

A—0 to 5 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; about 5 percent gravel; very strongly acid; abrupt smooth boundary.

BE—5 to 8 inches; brown (7.5YR 5/4) fine sandy loam; weak medium granular structure; very friable; many medium roots; 10 percent gravel; very strongly acid; clear smooth boundary.

Bt1—8 to 21 inches; yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; friable; common medium roots; few faint clay films on faces of peds; about 10 percent gravel; very strongly acid; gradual smooth boundary.

Bt2—21 to 41 inches; yellowish red (5YR 5/8) clay loam; common medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few medium roots; common faint clay films on faces of peds; about 10 percent gravel; very strongly acid; gradual wavy boundary.

BC—41 to 47 inches; mottled yellowish red (5YR 5/8), brownish yellow (10YR 6/6), and pale brown (10YR 6/3) loam; weak medium subangular blocky structure; friable; about 14 percent gravel; very strongly acid; gradual wavy boundary.
Cr—47 to 60 inches; level, weathered sandstone bedrock.

The thickness of the solum ranges from 30 to 50 inches. The depth to bedrock ranges from 40 to 60 inches. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas. The content of coarse fragments is as much as 10 percent in the A horizon and as much as 15 percent in the lower part of the B horizon.

The A horizon is 4 to 12 inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6.

The BE horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam or loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It has few to many brownish and yellowish mottles in the lower part. It is clay loam or sandy clay loam.

The BC horizon has the same colors as the Bt horizon, or it is mottled with reddish, brownish, or yellowish colors. The horizon is sandy clay loam or loam.

The Cr horizon is level, bedded weathered sandstone or interbedded sandstone and shale.

Nella Series

The Nella series consists of well drained, moderately permeable soils on foot slopes and in other areas on uplands. These soils formed in colluvium weathered from sandstone and shale. The slope is 25 to 45 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Nella soils are associated with Allen, Gorgas, and Tidings soils. These associated soils are in the uplands. Allen soils have less than 15 percent rock fragments throughout the profile. Gorgas soils have sandstone bedrock within a depth of 20 inches. Tidings soils have shale bedrock at a depth of 20 to 40 inches.

Typical pedon of Nella stony fine sandy loam, 25 to 45 percent slopes, very stony, 1 mile south of Ringgold on U.S. Highway 41; 100 feet north of highway:

A—0 to 6 inches; brown (10YR 5/3) stony fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; about 14 percent stones and 10 percent cobbles; very strongly acid; clear smooth boundary.
E—6 to 12 inches; light yellowish brown (10YR 6/4) stony loam; weak fine subangular blocky structure; very friable; many medium roots; about 25 percent stones and 5 percent cobbles; very strongly acid; clear smooth boundary.
Bt1—12 to 23 inches; yellowish red (5YR 5/6) stony clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few medium roots; about 20 percent stones; very strongly acid; clear wavy boundary.
Bt2—23 to 41 inches; red (2.5YR 5/6) cobbly clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; about 20 percent cobbles; very strongly acid; gradual wavy boundary.
Bt3—41 to 63 inches; red (2.5YR 5/6) cobbly clay loam; common medium prominent strong brown (7.5YR 5/6) and yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; about 25 percent cobbles; very strongly acid.

The solum is 60 or more inches thick. The content of sandstone fragments 3 to 24 inches in size is more than 15 percent throughout the profile. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 4 to 12 inches thick. It has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is stony fine sandy loam or stony loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It is mottled with brownish, yellowish, or reddish colors in the lower part. It is typically stony clay loam, cobbly clay loam, stony sandy clay loam, or cobbly sandy clay loam, but the range in the lower part of some pedons includes stony clay or cobbly clay.

Rome Series

The Rome series consists of well drained, moderately permeable soils on stream terraces. These soils formed in loamy sediments. The slope is 0 to 6 percent. The soils are fine-loamy, mixed, thermic Typic Hapludults.

Rome soils are associated with Chenneby, Holston, and Whitwell soils. Chenneby soils are on flood plains. Holston soils are on stream terraces and on foot slopes in the uplands. Whitwell soils are in landscape positions similar to those of the Rome soils. The somewhat poorly drained Chenneby soils do not have an argillic horizon. The content of clay in the Holston soils

decreases by less than 20 percent at a depth of about 60 inches. Whitwell soils are moderately well drained.

Typical pedon of Rome silt loam, 2 to 6 percent slopes, 1.2 miles north of Ringgold on Georgia Highway 151; 0.3 mile east on paved road; 150 feet south of paved road:

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; about 1 percent black concretions; about 2 percent pebbles, by volume; slightly acid; abrupt smooth boundary.

Bt1—10 to 19 inches; strong brown (7.5YR 5/6) clay loam; weak fine subangular blocky structure; friable; common fine roots; few fine pores; about 5 percent pebbles, by volume; about 3 percent black concretions; strongly acid; clear wavy boundary.

Bt2—19 to 30 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds; about 5 percent pebbles, by volume; about 5 percent black concretions; strongly acid; clear wavy boundary.

Bt3—30 to 42 inches; brownish yellow (10YR 6/8) clay loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; about 5 percent pebbles; about 5 percent strong brown concretions; strongly acid; clear wavy boundary.

BC—42 to 60 inches; brownish yellow (10YR 6/6) clay loam; weak medium subangular blocky structure; friable; common fine roots; about 10 percent pebbles, by volume; strongly acid.

The solum is 60 or more inches thick. The soils are very strongly acid or strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 6 to 10 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 to 4.

The BA horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. In some pedons it has gray or light gray mottles within the upper 24 inches. It is clay loam or sandy clay loam.

The BC horizon has colors similar to those of the Bt horizon, or it is mottled with reddish, brownish, or yellowish colors. It is clay loam or sandy clay loam.

Shack Series

The Shack series consists of moderately well drained soils in the uplands. These soils formed in residuum from cherty limestone. The soils are oriented in a northeast-southwest direction. Permeability is moderately slow in the brittle layer of the subsoil. The slope is 2 to 25 percent. The soils are fine-loamy, siliceous, thermic Fragic Paleudults.

Shack soils are associated with Bodine, Fullerton, and Minvale soils. These associated soils are in landscape positions similar to those of the Shack soils. Bodine soils have 34 percent or more chert fragments and are somewhat excessively drained. Fullerton soils have more than 35 percent clay in the argillic horizon. Minvale soils are not dense and brittle in the B horizon.

Typical pedon of Shack gravelly silt loam, in an area of Minvale-Shack gravelly silt loams, 6 to 10 percent slopes; 0.9 mile west of Pleasant Grove Baptist Church on loop road; 0.6 mile west of road:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly silt loam; weak fine granular structure; very friable; about 25 percent chert fragments; common fine roots; medium acid; clear wavy boundary.

E—5 to 12 inches; light yellowish brown (10YR 6/4) gravelly silt loam; moderate medium granular structure; very friable; about 15 percent chert fragments; common fine roots; strongly acid; gradual wavy boundary.

BE—12 to 21 inches; yellowish brown (10YR 5/4) gravelly silt loam; moderate medium granular structure; friable; about 18 percent chert fragments; few fine roots; very strongly acid; gradual irregular boundary.

Bx1—21 to 27 inches; yellowish brown (10YR 5/4) gravelly loam; common medium distinct very pale brown (10YR 7/3) mottles; moderate medium granular structure; firm to slightly brittle; few fine roots; about 25 percent chert fragments; dense and brittle in 10 percent of the horizon, by volume; very strongly acid; clear irregular boundary.

Bx2—27 to 32 inches; mottled yellowish red (5YR 5/6), yellowish brown (10YR 5/4), and pale brown (10YR 6/3) gravelly loam; moderate medium subangular blocky structure; friable to slightly brittle; few fine roots; about 25 percent chert fragments; dense and brittle in 35 percent of the horizon, by volume; very strongly acid; clear wavy boundary.

Btx—32 to 40 inches; red (2.5YR 5/6) gravelly silty clay loam; horizontal lenses of dark yellowish brown (10YR 4/4) silty clay 1 to 2 centimeters thick and 2 to 5 centimeters apart; weak medium subangular blocky structure; few old roots in the silty clay part; about 30 percent chert fragments; dense and brittle in about 45 percent of the horizon, by volume; very strongly acid; clear wavy boundary.

Bt—40 to 60 inches; red (2.5YR 5/6) gravelly silty clay loam; many medium prominent very pale brown (10YR 7/3) and common medium prominent yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; firm; about 35 percent chert fragments; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The depth to bedrock is more than 8 feet. The solum has 15 to 35 percent chert fragments. The content of chert fragments ranges from 35 to 50 percent in the lower part of some pedons. The depth to horizons that are dense and brittle ranges from 20 to 40 inches. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 4 to 6 inches thick. It has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4.

The E horizon is 4 to 10 inches thick. It has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6.

The BE horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 4 to 6. It is gravelly silt loam, gravelly clay loam, or gravelly silty clay loam.

The Bx horizon has hue of 10YR to 2.5YR, value of 5 or 6, and chroma of 6 to 8. It has common or many reddish or brownish mottles. In some pedons it has grayish mottles below a depth of 30 inches. Some subhorizons are as much as 40 to 60 percent, by volume, dense and brittle. Other subhorizons have 10 to 40 percent brittleness. The Bx horizon is gravelly loam or gravelly silty clay loam.

The Bt horizon has hue of 10YR to 2.5YR, value of 5 or 6, and chroma of 4 to 8, or it is mottled with reddish, brownish, yellowish, or grayish colors and has no dominant matrix colors. It is gravelly silty clay loam or gravelly clay loam.

Talbott Series

The Talbott series consists of well drained, moderately slowly permeable soils in the uplands. These soils formed in material weathered from limestone. The depth to bedrock ranges from 20 to 40 inches. The slope is 2 to 15 percent. The soils are fine, mixed, thermic Typic Hapludalfs.

Talbott soils are associated with Conasauga, Decatur, Lyerly, and Tupelo soils. All of the associated soils except Tupelo soils are in landscape positions similar to those of the Talbott soils. The somewhat poorly drained Tupelo soils are in the uplands and on stream terraces. Conasauga soils are moderately well drained and are underlain by shale. Decatur soils are dark red throughout the profile and are more than 60 inches deep over bedrock. Lyerly soils have a yellow subsoil and are more than 60 percent clay in the subsoil.

Typical pedon of Talbott silt loam, 2 to 6 percent slopes, 4.0 miles south of the Tennessee state line on Georgia Highway 151; 0.6 mile west on paved road from Pleasant Valley Church; 150 feet north of road:

Ap—0 to 4 inches; brown (7.5YR 5/2) silt loam; weak fine granular structure; friable; many fine roots; about 3 percent gravel; strongly acid; clear smooth boundary.

Bt1—4 to 12 inches; yellowish red (5YR 4/6) silty clay; weak medium subangular blocky structure; firm; plastic; common fine and medium roots; few faint clay films on faces of peds; about 5 percent gravel; strongly acid; gradual smooth boundary.

Bt2—12 to 27 inches; red (2.5YR 4/8) clay; moderate medium angular blocky structure; firm; plastic; few medium roots; common prominent clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—27 to 37 inches; red (2.5YR 5/8) clay; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; strong medium angular blocky structure; firm; very plastic; few medium roots; common black concretions; medium acid.

R—37 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The soils are strongly acid or medium acid, but the horizon near bedrock ranges from medium acid to mildly alkaline.

The Ap horizon is 3 to 8 inches thick. It has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. It is silt loam or silty clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is clay or silty clay.

The BC and C horizons, if they occur, have colors similar to those of the Bt horizon. In some pedons they have few to many reddish, brownish, or grayish mottles. Concretions are few or common in some pedons.

Tidings Series

The Tidings series consists of well drained, moderately permeable soils in the uplands. These soils formed in loamy material weathered from shale or interbedded shale and sandstone. The depth to bedrock ranges from 40 to 60 inches. The slope is 10 to 70 percent. The soils are fine-loamy, mixed, thermic Typic Hapludults.

Tidings soils are associated with Cunningham,

Gorgas, and Townley soils. These associated soils are in landscape positions similar to those of the Tidings soils. Cunningham soils have more than 35 percent clay in the control section. Gorgas soils are less than 20 inches deep over sandstone bedrock. Townley soils are 20 to 40 inches deep over shale. They are in a clayey family.

Typical pedon of Tidings gravelly loam, in an area of Tidings-Townley complex, 25 to 45 percent slopes; 1.0 mile east of U.S. Highway 41 on Georgia Highway 2; 0.5 mile north on paved road; 150 feet west of road:

A1—0 to 2 inches; dark brown (10YR 3/3) gravelly loam; weak fine granular structure; very friable; many fine roots; about 15 percent gravel; very strongly acid; clear smooth boundary.
A2—2 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam; weak medium granular structure; very friable; about 15 percent gravel; common fine roots; very strongly acid; clear smooth boundary.
Bt1—6 to 10 inches; yellowish brown (10YR 5/4) gravelly loam; weak fine subangular blocky structure; very friable; about 25 percent gravel; common medium roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt2—10 to 31 inches; yellowish brown (10YR 5/4) gravelly clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky and angular blocky structure; friable; common faint clay films on faces of peds; about 15 percent gravel; about 10 percent soft shale fragments; very strongly acid; gradual wavy boundary.
C—31 to 43 inches; yellowish brown (10YR 5/4) and pale brown (10YR 6/3) gravelly loam; massive; friable; about 15 percent gravel; about 20 percent shale fragments; very strongly acid; gradual wavy boundary.
Cr—43 inches; highly weathered shale that has interbedded sandstone and siltstone.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock ranges from 40 to 60 inches. The content of gravel ranges from 15 to 35 percent throughout the solum. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap or A horizon is 2 to 6 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 to 4.

The Bt horizon has hue of 10YR and value and chroma of 4 to 6. It has common or many yellowish, brownish, or grayish mottles in the lower part. It is gravelly loam or gravelly clay loam.

The C and Cr horizons have yellowish, brownish, or grayish mottles. The C horizon is gravelly loam or gravelly silty clay loam. The Cr horizon is soft shale or interbedded shale, siltstone, and sandstone bedrock.

Townley Series

The Townley series consists of well drained, slowly permeable soils in the uplands. These soils formed in clayey material weathered from shale or interbedded shale and sandstone. The depth to bedrock ranges from 20 to 40 inches. The slope is 2 to 45 percent. The soils are clayey, mixed, thermic Typic Hapludults.

Townley soils are associated with Armuchee, Cunningham, and Tidings soils. These associated soils are in landscape positions similar to those of the Townley soils. Armuchee soils are 10 to 20 inches deep over shale. Cunningham soils are more than 40 inches deep over shale. Tidings soils have 15 to 35 percent gravel and are in a fine-loamy family.

Typical pedon of Townley silt loam, 2 to 10 percent slopes, 0.3 mile north of Nellie Head Baptist Church on Georgia Highway 2; 150 feet west of road:

Ap—0 to 6 inches; light yellowish brown (10YR 6/4) silt loam; weak fine granular structure; very friable; about 5 percent shale fragments; medium acid; abrupt smooth boundary.
Bt1—6 to 13 inches; brown (7.5YR 5/4) silty clay loam; weak medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; about 5 percent shale fragments; strongly acid; clear wavy boundary.
Bt2—13 to 20 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm; about 5 percent shale fragments; few fine roots; few faint clay films on faces of peds; strongly acid; clear wavy boundary.
Bt3—20 to 27 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; about 10 percent highly weathered shale fragments; strongly acid; clear wavy boundary.
Cr—27 to 40 inches; consolidated, level, bedded shale.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of shale fragments ranges from 5 to 15 percent in the solum. The soils are strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap or A horizon is 5 to 8 inches thick. It has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 2 to 4. The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8.

Tupelo Series

The Tupelo series consists of somewhat poorly drained, slowly permeable soils in the uplands and on stream terraces. These soils formed in sediments or residuum or both. The depth to bedrock ranges from 40 to 70 inches. The slope is 0 to 2 percent. The soils are fine, mixed, thermic Aquic Hapludalfs.

Tupelo soils are associated with Capshaw and Lyerly soils. These associated soils are in the uplands. Capshaw soils are moderately well drained. The well drained and moderately well drained Lyerly soils have hard bedrock at a depth of 20 to 40 inches and are very slowly permeable.

Typical pedon of Tupelo silt loam, 0 to 2 percent slopes, rarely flooded, in Chickamauga National Military Park, 0.6 mile east on Reed's Bridge Road from the junction with U.S. Highway 27; 100 feet north of road:

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine and medium roots; few small voids; medium acid; abrupt smooth boundary.

Bt1—6 to 12 inches; dark brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure; slightly sticky; common fine roots; few small voids; medium acid; clear wavy boundary.

Bt2—12 to 20 inches; light yellowish brown (10YR 6/4) clay; common medium prominent olive (5Y 5/4) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; many prominent clay films on faces of peds; neutral; gradual wavy boundary.

Bt3—20 to 40 inches; yellowish brown (10YR 5/8) clay; common medium prominent light gray (5Y 7/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; neutral; gradual wavy boundary.

Btg—40 to 51 inches; light olive gray (5Y 6/2) and olive gray (5Y 5/2) clay; weak medium subangular blocky structure; slightly sticky; neutral.

R—51 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 40 to more than 60 inches. The soils are strongly acid or medium acid in the A horizon and the upper part of the B horizon and strongly acid to moderately alkaline in the lower horizons.

The A horizon is 6 to 8 inches thick. It has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. Gray mottles are within the upper 10 inches of the horizon, and grayish or olive mottles are in the lower part. In some pedons brownish or yellowish mottles are few or common. This horizon is silty clay loam, silty clay, or clay.

The Btg horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2. It has common or many olive or brownish mottles. It is silty clay or clay.

Wax Series

The Wax series consists of moderately well drained soils on the foot slopes of uplands and near drainageways. These soils formed in sediments weathered from cherty limestone. They are 18 to 38 inches deep over a fragipan. Permeability is slow in the brittle part of the subsoil. The slope is 0 to 6 percent. The soils are fine-loamy, siliceous, thermic Typic Fragiudults.

Wax soils are associated with Chenneby, Minvale, and Shack soils. Chenneby soils are on flood plains. Minvale and Shack soils are in the uplands. None of the associated soils has a fragipan.

Typical pedon of Wax loam, 0 to 2 percent slopes, occasionally flooded, about 1.5 miles north on Georgia Highway 2 to Keith; 0.8 mile north of Keith Church; 300 feet west of road; 300 feet south of Tiger Creek:

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine roots; about 3 percent chert fragments; very strongly acid; clear smooth boundary.

BA—7 to 12 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; very friable; many fine roots and pores; about 3 percent chert fragments; very strongly acid; clear wavy boundary.

Bt1—12 to 23 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; about 5 percent chert fragments; very strongly acid; clear wavy boundary.

Bt2—23 to 34 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct very pale brown (10YR 7/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; about 10 percent chert fragments; common faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Btx1—34 to 49 inches; yellowish brown (10YR 5/6) very gravelly clay loam; common medium prominent light brownish gray (2.5Y 6/2) and red (2.5YR 5/8) mottles; massive in place parting to weak medium subangular blocky structure; firm, brittle, and hard; about 50 percent chert fragments; dense and brittle in about 65 percent of the horizon, by volume; very

strongly acid; clear wavy boundary.
Btx2—49 to 63 inches; mottled brownish yellow (10YR 6/6), strong brown (7.5YR 5/6), and light brownish gray (2.5Y 6/2) very gravelly clay loam; massive in place parting to weak coarse angular blocky structure; firm and brittle; about 60 percent chert fragments; dense and brittle in about 70 percent of the horizon, by volume; very strongly acid.

The thickness of the solum ranges from 40 to 72 inches. Depth to the fragipan ranges from 18 to 38 inches. The content of chert ranges from 3 to 15 percent above the fragipan and from 20 to 75 percent in the fragipan. The soils are very strongly acid or strongly acid throughout the profile, except for the surface layer in limed areas. The content of clay between the top of the argillic horizon and the top of the fragipan ranges from 20 to 35 percent.

The A horizon is 7 to 12 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 to 6.

The BA horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. It is silt loam, clay loam, or loam.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. It is silty clay loam or clay loam. The Bt2 horizon has few to many brownish mottles, and in some pedons it has olive mottles.

The Btx horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. It has common or many grayish, brownish, or reddish mottles, or it is mottled throughout with yellowish, brownish, and grayish colors and has no dominant matrix colors. It is very gravelly sandy clay loam or very gravelly clay loam.

Whitwell Series

The Whitwell series consists of moderately well drained, moderately permeable soils on stream terraces. These soils formed in loamy sediments. The slope is 1 to 3 percent. The soils are fine-loamy, siliceous, thermic Aquic Hapludults.

Whitwell soils are associated with Chenneby, Holston, and Rome soils. Chenneby soils are on flood plains. Holston soils are on stream terraces and on foot slopes in the uplands. Rome soils are in landscape positions similar to those of the Whitwell soils. The somewhat poorly drained Chenneby soils do not have an argillic horizon. Holston and Rome soils are well drained. The content of clay in the Holston soils decreases by 20 percent or less at a depth of about 60 inches, and that in the Rome soils decreases by more than 20 percent at that depth.

Typical pedon of Whitwell loam, 1 to 3 percent slopes, occasionally flooded, 0.6 mile north on U.S. Highway 41 from the junction with Interstate Highway 75; 0.5 mile west on dirt road; 100 feet north of road:

Ap—0 to 7 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable; many fine and medium roots; medium acid; clear wavy boundary.
AB—7 to 12 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; very friable; many fine roots; strongly acid; clear smooth boundary.
Bt1—12 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds; about 3 percent gravel; strongly acid; gradual wavy boundary.
Bt2—23 to 41 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; about 8 percent gravel; strongly acid; gradual wavy boundary.
BC—41 to 63 inches; yellowish brown (10YR 5/4) loam; common medium distinct strong brown (7.5YR 5/8) and light gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; about 10 percent gravel; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The soils are very strongly acid or strongly acid throughout the profile, except for the surface layer in limed areas.

The A horizon is 5 to 12 inches thick. It has hue of 10YR, value of 3 to 5, and chroma of 2 to 4.

The AB horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loam or clay loam. Mottles that have chroma of 2 or less are within the upper 10 inches of the horizon.

The BC horizon has colors similar to those of the Bt horizon, or it is mottled with brownish and grayish colors. It is loam or clay loam.

Formation of the Soils

Soil characteristics are determined by the physical and mineralogical composition of the parent material; the plant and animal life on and in the soil; the climate under which the parent material accumulated and has existed since accumulation; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material *(6)*. All of these factors influence every soil, but the significance of each factor varies from place to place. In one area, one factor may dominate soil formation; in another area, a different factor may be dominant.

The interrelationships among these five factors are complex, and the effects of any one factor cannot be isolated and completely evaluated. It is convenient, however, to describe each factor separately and to indicate the probable effects of each.

Parent Material

Parent material is the unconsolidated mass in which soil forms. The chemical and mineralogical composition of the soil is derived largely from the parent material. The soils in Catoosa County formed mainly in material weathered from ridge and valley sedimentary rocks *(9)*.

The soils on uplands in Catoosa County formed in limestone, shale, or sandstone. Lyerly, Minvale, and Fullerton soils are the major soils in the county that formed in limestone. These soils are very gently sloping to very steep. They have a brownish, loamy surface layer and a brownish or reddish, loamy or clayey subsoil that is mottled in places. They are underlain by limestone bedrock or material weathered from limestone. The soils of minor extent that formed in limestone are Talbott and Bodine soils.

Townley and Cunningham soils are the major soils that formed in shale. These soils are very gently sloping to steep. They have a brownish, loamy surface layer and a brownish or a mainly yellowish, clayey subsoil. They are underlain by shale bedrock. The soils of minor extent that formed in shale are Conasauga soils.

Tidings and Nella soils are the major soils that formed in sandstone, shale, or both. These steep and very steep soils are loamy and are gravelly or stony throughout. They have a brownish surface layer and a subsoil that is brownish or is mainly reddish. They are underlain by sandstone, shale, or both.

Stream terraces and colluvial areas are near most of the creeks and rivers in Catoosa County. The soils in these areas formed in sediment that is more recent than that in which the soils on uplands formed but that is older than the sediment on the lower alluvial plain. The nearly level and very gently sloping, well drained Rome soils are the major soils that formed in this material. These soils are loamy throughout. They have a brownish surface layer and a mainly yellowish subsoil. The soils of minor extent that formed in this parent material are Tupelo and Wax soils.

Stream alluvium is adjacent to all of the streams in Catoosa County. The soils in this alluvium formed more recently than the other soils in the county. The nearly level, somewhat poorly drained Chenneby soils are the major soils on flood plains. These soils are loamy throughout. They have a brownish surface layer and brownish underlying layers that are mainly mottled. The soils of minor extent that formed in alluvium are Cedarbluff and Ennis soils.

Plants and Animals

The effects of plants, animals, and other organisms on soil formation are significant. Plants and animals increase the content of organic matter and nitrogen in the soil, increase or decrease the content of plant nutrients, and alter soil structure and porosity.

Plants recycle nutrients, add organic matter, and provide food and cover for animals. They stabilize the surface layer so that soil-forming processes can continue. They also provide a more stable environment for the soil-forming processes by protecting the soils from extremes in temperature.

The soils in Catoosa County formed under a succession of briers, brambles, and woody plants that yielded to pine and hardwoods. Later, the hardwoods suppressed most other plants and became the climax vegetation.

Animals rearrange soil material by roughening the surface, forming and filling channels, and shaping the peds and voids. The soil is mixed by ants, wasps,

worms, and spiders, which make channels; by crustacea, such as crabs and crayfish; and by turtles and foxes, which dig burrows. Humans affect the soil-forming process by tilling the crops, removing natural vegetation and establishing different plants, and reducing or increasing the level of fertility.

Bacteria, fungi, and other micro-organisms hasten the decomposition of organic matter and increase the rate at which minerals are released for plant growth. The net gains and losses caused by plants and animals are important in Catoosa County. The relationships among plants and animals, climate, and parent material, however, are very close; therefore, the soils within the county do not differ significantly because of plants and animals.

Climate

The present climate of Catoosa County is thought to be similar to the climate that existed as the soils formed. The relatively high rainfall and warm temperature contribute to rapid soil formation and are the two most important climatic features that relate to soil properties.

Water from precipitation is essential in the formation of soil. Water dissolves soluble materials and is used by plants and animals. It transports material from one part of the soil to another part and from one area to another.

The soils in Catoosa County formed under a thermic temperature regime; that is, the mean soil temperature at a depth of about 20 inches is 50 to 72 degrees F. Based on the mean annual air temperature, the estimated soil temperature in Catoosa County is about 60 degrees. The rate of chemical reactions and other processes in the soil depends to some extent on temperature. In addition, temperature affects the type and quantity of vegetation, the amount and kind of organic matter, and the rate at which the organic matter decomposes.

Relief

Relief is the elevations, or inequalities, of the land surface considered collectively. The color of the soil, the degree of wetness, the thickness of the A horizon, the content of organic matter, and the plant cover are commonly related to relief. In Catoosa County, the most obvious effects of relief are those that relate to the color of the soil and the degree of wetness.

Fullerton and Minvale soils have a mainly reddish subsoil, whereas the subsoil of Chenneby soils is mottled primarily in shades of brown and gray. This difference in color results from a difference in relief and a corresponding difference in internal drainage. Fullerton and Minvale soils are in the higher positions on the landscape and are better drained than the other soils; therefore, the soil material is better oxidized and the subsoil is reddish.

The movement of water across the surface and through the soil is controlled mostly by relief. Water flowing across the surface commonly carries solid particles and causes erosion or deposition, depending on the kind of relief. More water runs off the sloping areas; therefore, the soils are drier because less water penetrates the surface. The soils in the lower areas are commonly wetter because they receive the water that flows off and through the soils in the higher positions on the landscape.

Time

The length of time that the soil-forming processes have acted on the parent material helps to determine the characteristics of the soil. Determinations of when soil formation began in the survey area are not exact. Most of the soils are considered mature. Mature soils are in equilibrium with the environment. They are characterized by readily recognizable pedogenic horizons and a regular decrease in content of carbon with increasing depth. Some areas of upland soils are on rather broad, stable landscapes where the soil-forming processes have been active for thousands of years. These mature soils have a highly weathered solum and a well expressed zone of illuviation.

Chenneby soils receive sediment annually from floodwater. These young soils are stratified and are not old enough to have a zone of illuviation. They do not have pedogenic horizons. They are characterized by an irregular decrease in content of carbon with increasing depth.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; granular, prismatic, or blocky structure; redder or browner colors than those in the A horizon; or a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated,

weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level	0 to 2 percent
Very gently sloping	2 to 6 percent
Gently sloping	6 to 10 percent
Strongly sloping	10 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent
Very steep	45 to 70 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates.

The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at LaFayette, Georgia)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	49.9	28.0	39.0	72	4	47	5.37	3.42	7.12	9	0.7
February	54.7	29.9	42.3	77	7	59	4.98	2.56	7.08	8	.5
March	62.3	36.6	49.5	82	16	119	6.86	3.84	9.53	8	.3
April	73.5	45.5	59.5	89	27	290	4.65	2.80	6.30	7	.0
May	80.6	53.4	67.0	93	35	527	4.34	2.14	6.25	7	.0
June	86.9	61.7	74.3	98	44	729	3.93	2.45	5.26	7	.0
July	89.6	65.6	77.6	99	52	856	4.78	2.49	6.78	8	.0
August	89.4	64.7	77.1	99	53	840	3.45	1.69	4.98	6	.0
September	83.7	58.1	70.9	97	41	627	5.20	1.78	8.01	7	.0
October	73.2	44.8	59.0	89	25	289	3.14	1.27	4.71	5	.0
November	62.2	36.1	49.2	79	16	77	4.43	2.57	6.08	6	.0
December	52.9	30.0	41.5	74	8	30	5.31	2.69	7.58	8	.2
Yearly:											
Average	71.6	46.2	58.9	---	---	---	---	---	---	---	---
Extreme	---	---	---	102	1	---	---	---	---	---	---
Total	---	---	---	---	---	4,490	56.44	47.64	64.49	86	1.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at LaFayette, Georgia)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 3	Apr. 16	Apr. 29
2 years in 10 later than--	Mar. 27	Apr. 10	Apr. 24
5 years in 10 later than--	Mar. 12	Mar. 31	Apr. 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 30	Oct. 22	Oct. 8
2 years in 10 earlier than--	Nov. 4	Oct. 27	Oct. 13
5 years in 10 earlier than--	Nov. 15	Nov. 5	Oct. 22

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at LaFayette, Georgia)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	224	197	168
8 years in 10	232	204	175
5 years in 10	247	219	188
2 years in 10	262	233	201
1 year in 10	270	241	208

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AnB	Allen silt loam, 2 to 6 percent slopes	400	0.4
AnC	Allen silt loam, 6 to 10 percent slopes	670	0.6
AnD	Allen silt loam, 10 to 15 percent slopes	600	0.6
AnE	Allen silt loam, 15 to 25 percent slopes	790	0.8
AoC2	Allen clay loam, 6 to 10 percent slopes, eroded	240	0.2
ApB	Apison loam, 2 to 6 percent slopes	300	0.3
ApC	Apison loam, 6 to 10 percent slopes	1,300	1.3
ArC	Armuchee channery silt loam, 6 to 10 percent slopes	930	0.9
BoE	Bodine cobbly silt loam, 10 to 25 percent slopes, very stony	370	0.4
BoF	Bodine cobbly silt loam, 25 to 60 percent slopes, very stony	2,900	2.8
CaB	Capshaw silt loam, 2 to 6 percent slopes	434	0.4
Cb	Cedarbluff loam, occasionally flooded	1,310	1.3
Ce	Chenneby silt loam, occasionally flooded	9,030	8.6
CoB	Conasauga silt loam, 1 to 6 percent slopes	1,170	1.1
CoC	Conasauga silt loam, 6 to 10 percent slopes	500	0.5
CuB	Cunningham silt loam, 2 to 6 percent slopes	1,700	1.6
CuC	Cunningham silt loam, 6 to 10 percent slopes	1,200	1.2
CuD	Cunningham silt loam, 10 to 15 percent slopes	360	0.3
CxD2	Cunningham silty clay loam, 6 to 15 percent slopes, eroded	290	0.3
DaB	Decatur silt loam, 2 to 6 percent slopes	300	0.3
DaC	Decatur silt loam, 6 to 10 percent slopes	160	0.2
DcC2	Decatur silty clay loam, 6 to 10 percent slopes, eroded	140	0.1
DcD2	Decatur silty clay loam, 10 to 15 percent slopes, eroded	750	0.7
DeB	Dewey silt loam, 2 to 6 percent slopes	240	0.2
DeC	Dewey silt loam, 6 to 10 percent slopes	160	0.2
Em	Emory silt loam	200	0.2
Es	Ennis gravelly silt loam, 0 to 3 percent slopes, occasionally flooded	1,600	1.5
EtB	Etowah loam, 2 to 6 percent slopes	1,250	1.2
EtC	Etowah loam, 6 to 10 percent slopes	210	0.2
FeB	Fullerton gravelly silt loam, 2 to 6 percent slopes	255	0.2
FeC	Fullerton gravelly silt loam, 6 to 10 percent slopes,	1,200	1.2
FeD	Fullerton gravelly silt loam, 10 to 15 percent slopes	1,200	1.2
FeE	Fullerton gravelly silt loam, 15 to 40 percent slopes	1,400	1.3
FrE2	Fullerton gravelly silty clay loam, 10 to 25 percent slopes, eroded	470	0.4
FuC	Fullerton-Urban land complex, 2 to 10 percent slopes	900	0.9
HoB	Holston fine sandy loam, 2 to 6 percent slopes	825	0.8
HoC	Holston fine sandy loam, 6 to 10 percent slopes	270	0.3
Ke	Ketona silty clay loam, frequently flooded	710	0.7
LeB	Lyerly silty clay loam, 2 to 6 percent slopes	8,820	8.
LeC	Lyerly silty clay loam, 6 to 10 pecent slopes	1,930	1.
LrC	Lyerly-Rock outcrop complex, 2 to 10 percent slopes	2,095	2.
LuC	Lyerly-Urban land complex, 2 to 10 percent slopes	840	0.
MsC	Minvale-Shack gravelly silt loams, 6 to 10 percent slopes	6,450	6.
MsD	Minvale-Shack gravelly silt loams, 10 to 15 percent slopes	6,200	5.
MsE	Minvale-Shack gravelly silt loams, 15 to 25 percent slopes	8,000	7.
NaC	Nauvoo fine sandy loam, 6 to 10 percent slopes	250	0.
NaD	Nauvoo fine sandy loam, 10 to 15 percent slopes	910	0.
NaE	Nauvoo fine sandy loam, 15 to 35 percent slopes	575	0.
NeF	Nella stony fine sandy loam, 25 to 45 percent slopes, very stony	1,720	1.
RoA	Rome silt loam, 0 to 2 percent slopes, occasionally flooded	1,725	1.
RoB	Rome silt loam, 2 to 6 percent slopes	3,700	3.
SmB	Shack-Minvale gravelly silt loams, 2 to 6 percent slopes	1,340	1.
TaB	Talbott silt loam, 2 to 6 percent slopes	1,170	1.
TaC	Talbott silt loam, 6 to 10 percent slopes	700	0.
TbC2	Talbott silty clay loam, 6 to 10 percent slopes, eroded	330	0.
TbD2	Talbott silty clay loam, 10 to 15 percent slopes, eroded	465	0.
TgG	Tidings-Gorgas complex, 45 to 70 percent slopes	1,110	1.
TmD	Tidings-Townley complex, 10 to 25 percent slopes	780	0.
TmF	Tidings-Townley complex, 25 to 45 percent slopes	6,821	6.
TnC	Townley silt loam, 2 to 10 percent slopes	2,400	2.
TnE	Townley silt loam, 10 to 25 percent slopes	1,900	1.
TnF	Townley silt loam, 25 to 45 percent slopes	440	0.
ToC2	Townley silty clay loam, 2 to 10 percent slopes, eroded	280	0.
ToE2	Townley silty clay loam, 10 to 25 percent slopes, eroded	515	0.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
TpA	Tupelo silt loam, 0 to 2 percent slopes, rarely flooded	1,200	1.2
TuA	Tupelo silt loam, 0 to 2 percent slopes, frequently flooded	820	0.8
UpF	Udorthents-Pits complex, gently sloping to steep	365	0.4
WaA	Wax loam, 0 to 2 percent slopes, occasionally flooded	1,550	1.5
WaB	Wax loam, 2 to 6 percent slopes, rarely flooded	455	0.4
WhA	Whitwell loam, 1 to 3 percent slopes, occasionally flooded	1,310	1.3
	Total	103,900	100.0

TABLE 5.--IMPORTANT FARMLAND

(The acreage is as of the date when fieldwork was completed. Soils not listed do not qualify as prime farmland or as additional farmland of statewide importance)

Soil name and map symbol	Prime farmland acreage	Additional farmland acreage of statewide importance
AnB---- Allen	400	---
AnC---- Allen	---	670
ApB---- Apison	300	---
ApC---- Apison	---	1,300
CaB---- Capshaw	434	---
Cb---- Cedarbluff	---	1,310
Ce---- Chenneby	---	9,030
CoB---- Conasauga	1,170	---
CoC---- Conasauga	---	500
CuB---- Cunningham	1,700	---
CuC---- Cunningham	---	1,200
DaB---- Decatur	300	---
DaC---- Decatur	---	160
DeB---- Dewey	240	---
DeC---- Dewey	---	160
Em---- Emory	200	---
Es---- Ennis	1,600	---
EtB---- Etowah	1,250	---
EtC---- Etowah	---	210
FeB---- Fullerton	225	---

TABLE 5.--IMPORTANT FARMLAND--Continued

Soil name and map symbol	Prime farmland acreage	Additional farmland acreage of statewide importance
FeC---------- Fullerton	---	1,200
HoB---------- Holston	825	---
HoC---------- Holston	---	270
Ke---------- Ketona	---	710
LeB---------- Lyerly	---	8,820
LeC---------- Lyerly	---	1,930
MsC---------- Minvale-Shack	---	6,450
NaC---------- Nauvoo	---	250
RoA---------- Rome	---	1,725
RoB---------- Rome	3,700	---
SmB---------- Shack-Minvale	1,340	---
TaB---------- Talbott	1,170	---
TaC---------- Talbott	---	700
TnC---------- Townley	---	2,400
TpA---------- Tupelo	---	1,200
TuA---------- Tupelo	---	820
WaA---------- Wax	---	1,550
WaB---------- Wax	---	455
WhA---------- Whitwell	1,310	---
Total	16,194	43,020

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Grain sorghum	Pasture
		Bu	Bu	Bu	Bu	AUM*
AnB---------- Allen	IIe	90	36	54	60	6.5
AnC---------- Allen	IIIe	80	32	52	55	6.5
AnD---------- Allen	IVe	70	28	48	50	6.0
AnE---------- Allen	VIe	---	---	---	---	5.5
AoC2---------- Allen	IVe	65	25	44	45	5.3
ApB---------- Apison	IIe	85	30	50	60	7.0
ApC---------- Apison	IIIe	80	25	48	55	6.5
ArC---------- Armuchee	IVe	---	---	---	---	5.0
BoE---------- Bodine	VIs	---	---	---	---	4.0
BoF---------- Bodine	VIIs	---	---	---	---	---
CaB---------- Capshaw	IIe	75	30	45	50	6.0
Cb---------- Cedarbluff	IIIw	50	25	40	35	5.5
Ce---------- Chenneby	IIw	100	35	50	65	7.5
CoB---------- Conasauga	IIIe	60	30	45	40	6.0
CoC---------- Conasauga	VIe	---	---	---	---	5.5
CuB---------- Cunningham	IIe	65	30	45	40	6.0
CuC---------- Cunningham	IIIe	60	30	45	40	6.0
CuD---------- Cunningham	IVe	50	25	40	30	5.5
CxD2---------- Cunningham	VIe	---	---	---	---	5.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Grain sorghum	Pasture
		Bu	Bu	Bu	Bu	AUM*
DaB---------- Decatur	IIe	80	30	45	55	8.5
DaC---------- Decatur	IIIe	70	30	40	50	8.0
DcC2---------- Decatur	IVe	50	20	30	35	5.5
DcD2---------- Decatur	VIe	---	---	---	---	4.5
DeB---------- Dewey	IIe	90	35	55	55	7.0
DeC---------- Dewey	IIIe	80	30	50	50	6.5
Em---------- Emory	I	110	45	50	65	7.5
Es---------- Ennis	IIw	70	25	40	50	6.0
EtB---------- Etowah	IIe	95	35	50	60	7.0
EtC---------- Etowah	IIIe	85	30	45	55	6.5
FeB---------- Fullerton	IIe	80	30	45	55	6.0
FeC---------- Fullerton	IIIe	75	30	45	50	5.5
FeD---------- Fullerton	IVe	65	25	40	45	5.0
FeE---------- Fullerton	VIe	---	---	---	---	5.0
FrE2---------- Fullerton	IVe	65	25	40	45	5.0
FuC. Fullerton-Urban land						
HoB---------- Holston	IIe	90	30	45	55	7.5
HoC---------- Holston	IIIe	85	25	45	50	7.0
Ke---------- Ketona	IVw	---	---	---	---	6.0
LeB---------- Lyerly	IIIs	55	30	45	35	5.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Grain sorghum	Pasture
		Bu	Bu	Bu	Bu	AUM*
LeC---------- Lyerly	IVs	---	---	---	---	5.0
LrC: Lyerly----------	IVs	---	---	---	---	4.5
Rock outcrop.						
LuC. Lyerly-Urban land						
MsC---------- Minvale-Shack	IIIe	68	25	40	45	5.5
MsD---------- Minvale-Shack	IVe	60	20	30	40	5.0
MsE---------- Minvale-Shack	VIe	---	---	---	---	4.5
NaC---------- Nauvoo	IIIe	60	25	40	40	5.5
NaD---------- Nauvoo	IVe	50	20	40	35	5.0
NaE---------- Nauvoo	VIIe	---	---	---	---	---
NeF---------- Nella	VIIs	---	---	---	---	---
RoA---------- Rome	IIw	95	35	50	55	7.0
RoB---------- Rome	IIe	85	35	50	55	6.5
SmB---------- Shack-Minvale	IIe	73	31	45	50	6.0
TaB---------- Talbott	IIIe	60	25	45	40	5.0
TaC---------- Talbott	IVe	50	20	40	35	4.5
TbC2---------- Talbott	IVe	45	20	35	30	4.0
TbD2---------- Talbott	VIe	---	---	---	---	3.5
TgG---------- Tidings-Gorgas	VIIe	---	---	---	---	---
TmD---------- Tidings-Townley	VIe	---	---	---	---	5.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Grain sorghum	Pasture
		Bu	Bu	Bu	Bu	AUM*
TmF---------- Tidings-Townley	VIIe	---	---	---	---	---
TnC---------- Townley	IVe	50	20	40	45	5.0
TnE---------- Townley	VIe	---	---	---	---	4.5
TnF---------- Townley	VIIe	---	---	---	---	---
ToC2---------- Townley	IVe	50	20	40	45	5.0
ToE2---------- Townley	VIe	---	---	---	---	4.5
TpA---------- Tupelo	IIw	65	35	25	40	7.0
TuA---------- Tupelo	IVw	---	---	---	---	6.5
UpF**: Udorthents. Pits.						
WaA---------- Wax	IIw	65	30	45	40	5.0
WaB---------- Wax	IIe	55	25	40	40	5.5
WhA---------- Whitwell	IIw	85	35	35	55	7.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	200	---	---	---
II	27,614	11,199	16,415	---
III	24,340	14,210	1,310	8,820
IV	19,477	14,760	1,530	3,187
V	---	---	---	---
VI	15,760	15,390	---	370
VII	13,566	8,946	---	4,620
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index*	Potential productivity: Productivity class**	Trees to plant
AnB, AnC, AnD---- Allen	6A	Slight	Slight	Slight	Yellow poplar	87	6	Yellow poplar, loblolly pine, shortleaf pine.
					Shortleaf pine	72	8	
AnE---- Allen	3R	Moderate	Moderate	Moderate	Southern red oak	60	3	Shortleaf pine, Virginia pine.
					Shortleaf pine	60	6	
					Virginia pine	60	6	
AoC2---- Allen	6A	Slight	Slight	Slight	Yellow poplar	87	6	Yellow poplar, loblolly pine, shortleaf pine.
					Shortleaf pine	72	8	
ApB, ApC---- Apison	6A	Slight	Slight	Slight	Yellow poplar	90	6	Shortleaf pine, loblolly pine.
					Northern red oak	70	4	
					Shortleaf pine	70	8	
					Loblolly pine	80	8	
					Virginia pine	70	8	
ArC---- Armuchee	6A	Slight	Slight	Slight	Shortleaf pine	60	6	Loblolly pine, shortleaf pine.
					Virginia pine	60	6	
					White oak	60	3	
BoE---- Bodine	4R	Moderate	Moderate	Slight	Southern red oak	70	4	Loblolly pine, shortleaf pine.
					Yellow poplar	90	6	
					Shortleaf pine	70	8	
					Black oak	70	4	
BoF---- Bodine	3R	Severe	Severe	Severe	Southern red oak	60	3	Virginia pine, shortleaf pine, eastern redcedar.
					Virginia pine	60	6	
					Chestnut oak	60	3	
					Scarlet oak	60	3	
CaB---- Capshaw	6A	Slight	Slight	Slight	Yellow poplar	90	6	Loblolly pine, shortleaf pine, yellow poplar.
					Loblolly pine	80	8	
					Northern red oak	70	4	
Cb---- Cedarbluff	9W	Slight	Moderate	Moderate	Loblolly pine	90	9	
					Shortleaf pine	80	9	
					Sweetgum	80	7	
					Water oak	80	6	
Ce---- Chenneby	11W	Slight	Moderate	Moderate	Loblolly pine	100	11	Loblolly pine, yellow poplar, sweetgum, water oak, American sycamore.
					Sweetgum	100	10	
					Water oak	100	7	
					Yellow poplar	100	9	
					American sycamore	100	11	
CoB, CoC---- Conasauga	8C	Moderate	Moderate	Slight	Shortleaf pine	71	8	Loblolly pine, shortleaf pine, Virginia pine.
					Virginia pine	71	8	
					Loblolly pine	72	7	
					Eastern redcedar	50	---	
CuB, CuC, CuD---- Cunningham	6A	Slight	Slight	Slight	Shortleaf pine	58	6	Loblolly pine, Virginia pine.
					Loblolly pine	80	8	
					Virginia pine	65	7	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index*	Potential productivity: Productivity class**	Trees to plant
CxD2--Cunningham	7C	Severe	Moderate	Moderate	Loblolly pine	76	7	Loblolly pine, Virginia pine.
					Shortleaf pine	55	5	
					Virginia pine	60	6	
DaB, DaC, DcC2, DcD2--Decatur	7A	Slight	Slight	Slight	Shortleaf pine	66	7	Yellow poplar, loblolly pine, shortleaf pine, eastern white pine, loblolly pine.
					Yellow poplar	90	6	
					Loblolly pine	80	8	
					Virginia pine	70	8	
					Eastern white pine	80	10	
DeB, DeC--Dewey	6A	Slight	Slight	Slight	Yellow poplar	90	6	Yellow poplar, black walnut, loblolly pine, eastern white pine.
					White oak	70	4	
					Southern red oak	70	4	
					Shortleaf pine	73	8	
					Virginia pine	70	8	
					Loblolly pine	78	8	
Em--Emory	8A	Slight	Slight	Slight	Yellow poplar	104	8	Yellow poplar, black walnut, loblolly pine.
					Northern red oak	80	4	
					Loblolly pine	90	9	
					Black walnut	---	---	
					White ash	---	---	
					Black cherry	---	---	
Es--Ennis	8A	Slight	Slight	Slight	Yellow poplar	100	8	Yellow poplar, black walnut, loblolly pine.
					White oak	80	4	
					Loblolly pine	90	9	
EtB--Etowah	6A	Slight	Slight	Slight	Yellow poplar	90	6	Yellow poplar, loblolly pine.
					Southern red oak	80	4	
					Loblolly pine	90	9	
					Shortleaf pine	80	9	
EtC--Etowah	6A	Slight	Slight	Slight	Yellow poplar	90	6	Yellow poplar, loblolly pine.
					Southern red oak	80	4	
					Loblolly pine	90	9	
					Shortleaf pine	80	9	
FeB, FeC, FeD--Fullerton	6A	Slight	Slight	Slight	Yellow poplar	90	6	Yellow poplar, loblolly pine.
					Southern red oak	70	4	
					Shortleaf pine	67	7	
FeE, FrE2--Fullerton	6R	Moderate	Moderate	Slight	Yellow poplar	90	6	Yellow poplar, loblolly pine.
					Southern red oak	70	4	
					Shortleaf pine	67	7	
HoB, HoC--Holston	6A	Slight	Slight	Slight	Yellow poplar	86	6	Yellow poplar, loblolly pine.
					Northern red oak	78	4	
					Shortleaf pine	69	8	
Ke--Ketona	6W	Slight	Severe	Moderate	Sweetgum	80	6	Sweetgum, loblolly pine, water oak.
					Loblolly pine	80	8	
					Water oak	80	---	
LeB, LeC--Lyerly	6C	Slight	Moderate	Moderate	Loblolly pine	65	6	Loblolly pine, eastern redcedar.
					Shortleaf pine	60	6	
					Eastern redcedar	47	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index*	Productivity class**	Trees to plant
LrC***:								
Lyerly	6C	Slight	Moderate	Moderate	Loblolly pine	65	6	Loblolly pine, eastern redcedar.
					Shortleaf pine	60	6	
					Eastern redcedar	47	---	
Rock outcrop.								
MsC***, MsD***:								
Minvale	6A	Slight	Slight	Slight	Yellow poplar	90	6	Yellow poplar, black walnut, loblolly pine.
					White oak	70	4	
					Shortleaf pine	70	8	
					Loblolly pine	80	8	
					Virginia pine	70	8	
Shack	6A	Slight	Slight	Slight	Yellow poplar	89	6	Yellow poplar, shortleaf pine, loblolly pine.
					Loblolly pine	80	8	
					Shortleaf pine	73	8	
MsE***:								
Minvale	6R	Moderate	Moderate	Slight	Yellow poplar	90	6	Yellow poplar, black walnut, loblolly pine.
					White oak	70	4	
					Shortleaf pine	70	8	
					Loblolly pine	80	8	
					Virginia pine	70	8	
Shack	6R	Moderate	Moderate	Slight	Yellow poplar	89	6	Yellow poplar, shortleaf pine, loblolly pine.
					Loblolly pine	80	8	
					Shortleaf pine	73	8	
NaC, NaD	9A	Slight	Slight	Slight	Loblolly pine	89	9	Loblolly pine, Virginia pine, shortleaf pine, yellow poplar, sweetgum.
Nauvoo					Shortleaf pine	80	9	
					Virginia pine	80	8	
					Yellow poplar	100	8	
					Sweetgum	90	7	
NaE	9R	Moderate	Moderate	Slight	Loblolly pine	89	9	Loblolly pine, Virginia pine, shortleaf pine, yellow poplar, sweetgum.
Nauvoo					Shortleaf pine	80	9	
					Virginia pine	80	8	
					Yellow poplar	100	8	
					Sweetgum	90	7	
NeF	3R	Moderate	Severe	Severe	Southern red oak	60	3	Loblolly pine, shortleaf pine, Virginia pine.
Nella					Shortleaf pine	60	6	
					Virginia pine	60	6	
					Eastern redcedar	30	2	
RoA, RoB	6A	Slight	Slight	Slight	Yellow poplar	86	6	Yellow poplar, loblolly pine, Virginia pine, black walnut.
Rome					Loblolly pine	85	8	
					Shortleaf pine	69	8	
					Virginia pine	73	8	
SmB***:								
Shack	6A	Slight	Slight	Slight	Yellow poplar	89	6	Yellow poplar, shortleaf pine, loblolly pine.
					Loblolly pine	80	8	
					Shortleaf pine	73	8	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index*	Potential productivity: Productivity class**	Trees to plant
SmB***:								
Minvale	6A	Slight	Slight	Slight	Yellow poplar	90	6	Yellow poplar, black walnut, loblolly pine.
					White oak	70	4	
					Shortleaf pine	70	8	
					Loblolly pine	80	8	
					Virginia pine	70	8	
TaB, TaC, TbC2, TbD2 Talbott	3A	Slight	Slight	Slight	Northern red oak	65	3	Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar.
					Loblolly pine	80	8	
					Shortleaf pine	64	7	
					Eastern redcedar	46	4	
TgG***:								
Tidings	8R	Severe	Severe	Severe	Loblolly pine	80	8	Loblolly pine, shortleaf pine, northern red oak.
					Shortleaf pine	70	8	
					Virginia pine	70	8	
					Yellow poplar	90	6	
					Northern red oak	70	4	
Gorgas	6R	Severe	Severe	Severe	Loblolly pine	70	6	Loblolly pine, Virginia pine, eastern redcedar.
					Virginia pine	60	6	
					Shortleaf pine	60	6	
TmD***:								
Tidings	8A	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine, shortleaf pine, northern red oak.
					Shortleaf pine	70	8	
					Virginia pine	70	8	
					Yellow poplar	90	6	
					Northern red oak	70	4	
Townley	6R	Moderate	Severe	Severe	Loblolly pine	70	6	Loblolly pine, Virginia pine.
					Virginia pine	70	8	
					Shortleaf pine	60	6	
TmF***:								
Tidings	8R	Severe	Severe	Severe	Loblolly pine	80	8	Loblolly pine, shortleaf pine, northern red oak.
					Shortleaf pine	70	8	
					Virginia pine	70	8	
					Yellow poplar	90	6	
					Northern red oak	70	4	
Townley	6R	Severe	Severe	Severe	Loblolly pine	70	6	Loblolly pine, Virginia pine.
					Virginia pine	70	8	
					Shortleaf pine	60	6	
TnC Townley	6C	Slight	Moderate	Slight	Loblolly pine	70	6	Loblolly pine, Virginia pine.
					Virginia pine	70	8	
					Shortleaf pine	60	6	
TnE Townley	6R	Moderate	Severe	Severe	Loblolly pine	70	6	Loblolly pine, Virginia pine.
					Virginia pine	70	8	
					Shortleaf pine	60	6	
TnF Townley	6R	Severe	Severe	Severe	Loblolly pine	70	6	Loblolly pine, Virginia pine.
					Virginia pine	70	8	
					Shortleaf pine	60	6	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index*	Productivity class**	
ToC2---------- Townley	6C	Slight	Moderate	Moderate	Shortleaf pine-------	60	6	
ToE2---------- Townley	6R	Moderate	Severe	Severe	Shortleaf pine-------	60	6	
TpA, TuA---------- Tupelo	6W	Slight	Moderate	Moderate	Yellow poplar--------	90	6	Loblolly pine,
					Loblolly pine--------	80	8	southern red oak,
					Sweetgum------------	80	6	American sycamore,
					White oak-----------	70	4	eastern cottonwood.
					Southern red oak-----	70	4	
WaA, WaB---------- Wax	8A	Slight	Slight	Slight	Loblolly pine--------	80	8	Loblolly pine, yellow
					Yellow poplar--------	90	6	poplar.
					Shortleaf pine-------	70	8	
					Sweetgum------------	80	6	
WhA---------- Whitwell	7W	Slight	Slight	Moderate	Yellow poplar--------	95	7	Loblolly pine, eastern
					Northern red oak-----	75	4	white pine, sweetgum.
					Sweetgum------------	90	7	
					Loblolly pine--------	90	9	
					Eastern white pine---	90	12	

* Site index for base age 25 can be estimated by dividing the factor 1.3 into the site index for base age 50.

** Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

*** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AnB Allen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
AnC, AnD Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AnE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
AoC2 Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
ApB Apison	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: depth to rock.
ApC Apison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
ArC Armuchee	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
BoE Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, large stones, slope.
BoF Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, large stones, slope.
CaB Capshaw	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
Cb Cedarbluff	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ce Chenneby	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
CoB Conasauga	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, depth to rock.	Slight	Moderate: depth to rock.
CoC Conasauga	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CuB Cunningham	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight	Slight.
CuC, CuD, CxD2 Cunningham	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
DaB Decatur	Slight	Slight	Moderate: slope.	Slight	Slight.
DaC, DcC2, DcD2 Decatur	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
DeB Dewey	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
DeC Dewey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Em Emory	Slight	Slight	Slight	Slight	Slight.
Es Ennis	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, flooding.
EtB Etowah	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EtC Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FeB Fullerton	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
FeC, FeD Fullerton	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
FeE Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
FrE2 Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
FuC*: Fullerton	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
Urban land.					
HoB Holston	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HoC---------- Holston	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
Ke---------- Ketona	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.
LeB---------- Lyerly	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Moderate: depth to rock.
LeC---------- Lyerly	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: slope, depth to rock.
LrC*: Lyerly----------	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: depth to rock.
Rock outcrop.					
LuC*: Lyerly----------	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: depth to rock.
Urban land.					
MsC*, MsD*: Minvale----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
Shack----------	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
MsE*: Minvale----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Shack----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
NaC, NaD---------- Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
NaE---------- Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
NeF---------- Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RoA---------- Rome	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
RoB---------- Rome	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SmB*:					
Shack	Moderate: small stones, percs slowly.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Minvale	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
TaB Talbott	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Moderate: depth to rock.
TaC, TbC2, TbD2 Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
TgG*:					
Tidings	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Gorgas	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
TmD*:					
Tidings	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
TmF*:					
Tidings	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
TnC Townley	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: slope, small stones.	Slight	Moderate: depth to rock.
TnE Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
TnF Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
ToC2 Townley	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: slope, small stones.	Slight	Moderate: depth to rock.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ToE2 Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
TpA Tupelo	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
TuA Tupelo	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
UpF*: Udorthents. Pits.					
WaA Wax	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: flooding.	Slight	Moderate: wetness, flooding.
WaB Wax	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: slope, flooding.	Slight	Moderate: wetness, flooding.
WhA Whitwell	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Slight	Moderate: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AnB---- Allen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnC---- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AnD---- Allen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AnE---- Allen	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AoC2---- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ApB, ApC---- Apison	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ArC---- Armuchee	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BoE---- Bodine	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BoF---- Bodine	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
CaB---- Capshaw	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Cb---- Cedarbluff	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Ce---- Chenneby	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CoB---- Conasauga	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CoC---- Conasauga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CuB---- Cunningham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CuC, CuD---- Cunningham	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CxD2---- Cunningham	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
DaB, DaC, DcC2, DcD2---- Decatur	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DeB---- Dewey	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
DeC---- Dewey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Em---- Emory	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Es---- Ennis	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
EtB---- Etowah	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC---- Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FeB---- Fullerton	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FeC---- Fullerton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FeD---- Fullerton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FeE---- Fullerton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FrE2---- Fullerton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FuC*: Fullerton----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
HoB---- Holston	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HoC---- Holston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ke---- Ketona	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
LeB---- Lyerly	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor.
LeC---- Lyerly	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LrC*: Lyerly----	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Rock outcrop.										
LuC*: Lyerly----	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
LuC*: Urban land.										
MsC*, MsD*: Minvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Shack	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MsE*: Minvale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Shack	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NaC, NaD Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NaE Nauvoo	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NeF Nella	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
RoA Rome	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Fair.
RoB Rome	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SmB*: Shack	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Minvale	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TaB Talbott	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TaC, TbC2, TbD2 Talbott	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TgG*: Tidings	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Gorgas	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
TmD*: Tidings	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Townley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
TmF*:										
Tidings	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Townley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TnC Townley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TnE Townley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TnF Townley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ToC2 Townley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ToE2 Townley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TpA Tupelo	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
TuA Tupelo	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
UpF*:										
Udorthents.										
Pits.										
WaA, WaB Wax	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Poor	Poor.
WhA Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB Allen	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
AnC, AnD Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AnE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
AoC2 Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
ApB Apison	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: low strength.	Moderate: depth to rock.
ApC Apison	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope, depth to rock.
ArC Armuchee	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
BoE, BoF Bodine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, large stones, slope.
CaB Capshaw	Moderate: depth to rock, too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Cb Cedarbluff	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Ce Chenneby	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
CoB Conasauga	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: depth to rock.
CoC Conasauga	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
CuB Cunningham	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CuC, CuD, CxD2---- Cunningham	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
DaB---------- Decatur	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.
DaC, DcC2, DcD2--- Decatur	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
DeB---------- Dewey	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
DeC---------- Dewey	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Em---------- Emory	Slight---------	Slight---------	Moderate: wetness.	Slight---------	Severe: low strength.	Slight.
Es---------- Ennis	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: small stones, flooding.
EtB---------- Etowah	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
EtC---------- Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
FeB---------- Fullerton	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Severe: small stones.
FeC, FeD---------- Fullerton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Severe: small stones.
FeE, FrE2--------- Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
FuC*: Fullerton-------- Urban land.	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Severe: small stones.
HoB---------- Holston	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
HoC---------- Holston	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ke Ketona	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
LeB Lyerly	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: depth to rock.
LeC Lyerly	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope, depth to rock.
LrC*: Lyerly	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: depth to rock.
Rock outcrop.						
LuC*: Lyerly	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: depth to rock.
Urban land.						
MsC*, MsD*: Minvale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
Shack	Moderate: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
MsE*: Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Shack	Severe: slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
NaC, NaD Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
NaE Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
NeF Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RoA Rome	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
RoB Rome	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SmB*:						
Shack	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Slight	Moderate: small stones.
Minvale	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
TaB Talbott	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength.	Moderate: depth to rock.
TaC, TbC2, TbD2 Talbott	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
TgG*:						
Tidings	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gorgas	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
TmD*, TmF*:						
Tidings	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
TnC Townley	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: depth to rock.
TnE, TnF Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
ToC2 Townley	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: depth to rock.
ToE2 Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
TpA Tupelo	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
TuA Tupelo	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: flooding.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
UpF*: Udorthents. Pits.						
WaA, WaB---------- Wax	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
WhA---------- Whitwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnB Allen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AnC, AnD Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AnE Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
AoC2 Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
ApB Apison	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, depth to rock.
ApC Apison	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, depth to rock.
ArC Armuchee	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
BoE, BoF Bodine	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
CaB Capshaw	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
Cb Cedarbluff	Severe: flooding, wetness, percs slowly.	Slight	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: wetness, hard to pack.
Ce Chenneby	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
CoB Conasauga	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
CoC Conasauga	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CuB---------- Cunningham	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
CuC, CuD, CxD2------ Cunningham	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
DaB---------- Decatur	Slight----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
DaC, DcC2, DcD2----- Decatur	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
DeB---------- Dewey	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
DeC---------- Dewey	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Em---------- Emory	Moderate: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Slight----------	Fair: too clayey.
Es---------- Ennis	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Fair: small stones.
EtB---------- Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Moderate: too clayey.
EtC---------- Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Moderate: too clayey.
FeB---------- Fullerton	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Poor: small stones.
FeC, FeD---------- Fullerton	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
FeE, FrE2---------- Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
FuC*: Fullerton----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Poor: small stones.
Urban land.					

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HoB Holston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
HoC Holston	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
Ke Ketona	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
LeB Lyerly	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
LeC Lyerly	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
LrC*: Lyerly	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					
LuC*: Lyerly	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Urban land.					
MsC*, MsD*: Minvale	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones.
Shack	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
MsE*: Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Shack	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NaC, NaD---------- Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, depth to rock, slope.
NaE---------- Nauvoo	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
NeF---------- Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
RoA---------- Rome	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
RoB---------- Rome	Slight----------	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
SmB*:					
Shack----------	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, small stones.
Minvale----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, small stones.
TaB---------- Talbott	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
TaC, TbC2, TbD2----- Talbott	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
TgG*:					
Tidings----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Gorgas----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope, small stones.
TmD*, TmF*:					
Tidings----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Townley----------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TnC---------- Townley	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
TnE, TnF---------- Townley	Severe: depth to rock, slope, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
ToC2---------- Townley	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
ToE2---------- Townley	Severe: depth to rock, slope, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
TpA---------- Tupelo	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
TuA---------- Tupelo	Severe: flooding, wetness, percs slowly.	Slight----------	Severe: flooding, wetness, too clayey, depth to rock.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
UpF*: Udorthents.					
Pits.					
WaA, WaB---------- Wax	Severe: percs slowly, flooding.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding.	Poor: small stones.
WhA---------- Whitwell	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AnB, AnC, AnD Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
AnE Allen	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AoC2 Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
ApB, ApC Apison	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, small stones.
ArC Armuchee	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BoE Bodine	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BoF Bodine	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CaB Capshaw	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Cb Cedarbluff	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ce Chenneby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
CoB, CoC Conasauga	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CuB, CuC, CuD, CxD2 Cunningham	Fair: low strength, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DaB, DaC, DcC2, DcD2 Decatur	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
DeB, DeC Dewey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Em Emory	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Es Ennis	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EtB Etowah	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
EtC Etowah	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
FeB, FeC, FeD Fullerton	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
FeE Fullerton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
FrE2 Fullerton	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
FuC*: Fullerton	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Urban land.				
HoB, HoC Holston	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Ke Ketona	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
LeB, LeC Lyerly	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LrC*: Lyerly	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LuC*:				
Lyerly	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
MsC*, MsD*:				
Minvale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Shack	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MsE*:				
Minvale	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Shack	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
NaC, NaD Nauvoo	Fair: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
NaE Nauvoo	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
NeF Nella	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
RoA, RoB Rome	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
SmB*:				
Shack	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Minvale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
TaB, TaC, TbC2, TbD2-- Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
TgG*:				
Tidings	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TgG*:				
Gorgas	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
TmD*:				
Tidings	Fair: low strength, depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
TmF*:				
Tidings	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Townley	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
TnC Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
TnE Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
TnF Townley	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
ToC2 Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
ToE2 Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
TpA, TuA Tupelo	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
UpF*:				
Udorthents.				
Pits.				
WaA, WaB Wax	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WhA---------- Whitwell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AnB---------- Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
AnC, AnD---------- Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
AnE---------- Allen	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
AoC2---------- Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
ApB---------- Apison	Moderate: seepage, depth to rock.	Severe: thin layer, piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
ApC---------- Apison	Moderate: seepage, depth to rock.	Severe: thin layer, piping.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock.	Slope, depth to rock.
ArC---------- Armuchee	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty.
BoE, BoF---------- Bodine	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
CaB---------- Capshaw	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
Cb---------- Cedarbluff	Slight---------	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
Ce---------- Chenneby	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
CoB---------- Conasauga	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock	Depth to rock.
CoC---------- Conasauga	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
CuB---------- Cunningham	Moderate: depth to rock.	Moderate: hard to pack.	Deep to water	Percs slowly---	Percs slowly---	Percs slowly, rooting depth.
CuC, CuD, CxD2---- Cunningham	Moderate: depth to rock.	Moderate: hard to pack.	Deep to water	Percs slowly---	Slope, percs slowly.	Slope, percs slowly, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
DaB---------- Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
DaC, DcC2, DcD2--- Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
DeB---------- Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
DeC---------- Dewey	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Em---------- Emory	Moderate: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
Es---------- Ennis	Severe: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
EtB---------- Etowah	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Slope----------	Favorable------	Favorable.
EtC---------- Etowah	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Slope----------	Slope----------	Slope.
FeB---------- Fullerton	Moderate: seepage.	Severe: piping, hard to pack.	Deep to water	Slope----------	Large stones---	Large stones.
FeC, FeD---------- Fullerton	Moderate: seepage.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
FeE---------- Fullerton	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
FrE2---------- Fullerton	Moderate: seepage.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
FuC*: Fullerton--------	Moderate: seepage.	Severe: piping, hard to pack.	Deep to water	Slope----------	Large stones---	Large stones.
Urban land.						
HoB---------- Holston	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
HoC---------- Holston	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
Ke---------- Ketona	Slight---------	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
LeB---------- Lyerly	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock	Depth to rock.
LeC---------- Lyerly	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
LrC*:						
Lyerly----------	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock	Depth to rock.
Rock outcrop.						
LuC*:						
Lyerly----------	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock	Depth to rock.
Urban land.						
MsC*, MsD*:						
Minvale----------	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
Shack----------	Moderate: seepage.	Moderate: piping, wetness.	Slope----------	Slope----------	Slope----------	Slope.
MsE*:						
Minvale----------	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
Shack----------	Severe: slope.	Moderate: piping, wetness.	Slope----------	Slope----------	Slope----------	Slope.
NaC, NaD---------- Nauvoo	Moderate: seepage, depth to rock.	Moderate: thin layer, piping.	Deep to water	Slope----------	Slope----------	Slope.
NaE---------- Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Slope----------	Slope.
NeF---------- Nella	Severe: slope.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
RoA---------- Rome	Moderate: seepage.	Moderate: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
RoB---------- Rome	Moderate: seepage.	Moderate: piping.	Deep to water	Slope----------	Favorable------	Favorable.
Shack----------	Moderate: seepage.	Moderate: piping, wetness.	Slope----------	Slope----------	Favorable------	Favorable.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
SmB*:						
Minvale	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
TaB Talbott	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
TaC Talbott	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
TbC2, TbD2 Talbott	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
TgG*:						
Tidings	Severe: slope.	Moderate: thin layer.	Deep to water	Slope	Slope	Slope.
Gorgas	Severe: depth to rock, slope, seepage.	Severe: thin layer, piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
TmD*:						
Tidings	Moderate: seepage, depth to rock.	Moderate: thin layer.	Deep to water	Slope	Slope	Slope.
Townley	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
TmF*:						
Tidings	Severe: slope.	Moderate: thin layer.	Deep to water	Slope	Slope	Slope.
Townley	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
TnC Townley	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock	Depth to rock.
TnE Townley	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
TnF Townley	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
ToC2 Townley	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock	Depth to rock.
ToE2 Townley	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
TpA---------- Tupelo	Slight---------	Severe: hard to pack, wetness.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
TuA---------- Tupelo	Slight---------	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
UpF*: Udorthents.						
Pits.						
WaA---------- Wax	Slight---------	Slight---------	Flooding-------	Rooting depth, wetness, percs slowly.	Rooting depth, wetness.	Rooting depth, percs slowly.
WaB---------- Wax	Slight---------	Slight---------	Slope, flooding.	Rooting depth, wetness, percs slowly.	Rooting depth, wetness.	Rooting depth, percs slowly.
WhA---------- Whitwell	Moderate: seepage.	Severe: piping.	Flooding-------	Wetness, flooding.	Wetness--------	Favorable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
AnB, AnC, AnD, AnE---------- Allen	0-14	Silt loam, fine sandy loam.	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	14-52	Clay loam, sandy clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
	52-99	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	85-100	70-98	60-95	45-80	21-48	5-22
AoC2---------- Allen	0-4	Clay loam--------	CL-ML, CL, SM-SC, SC	A-4, A-6	0-10	90-100	90-100	80-98	35-80	20-39	5-20
	4-52	Clay loam, sandy clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
	52-60	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	85-100	70-98	60-95	45-80	21-48	5-22
ApB, ApC---------- Apison	0-11	Loam----------	ML, CL, CL-ML	A-4	0	85-100	75-100	65-90	55-85	18-30	3-10
	11-37	Clay loam, loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	85-100	75-100	70-95	60-90	20-40	4-18
	37-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
ArC---------- Armuchee	0-5	Channery silt loam.	CL, ML, CL-ML	A-4, A-6	0-2	70-80	65-75	60-70	50-65	25-39	5-15
	5-13	Channery silty clay, channery silty clay loam.	MH, ML, CL, CH	A-6, A-7	0-2	65-85	60-80	55-80	50-70	37-65	13-35
	13-31	Extremely channery silty clay, very channery silty clay loam.	GM, GC, CL, CH	A-2, A-6, A-7	0-5	35-75	25-70	20-65	15-55	35-60	11-30
	31-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
BoE, BoF---------- Bodine	0-12	Cobbly silt loam	SM, SM-SC, GM, GM-GC	A-4, A-2, A-1	15-40	30-80	20-75	20-65	20-45	<30	NP-7
	12-30	Very gravelly silt loam, silty clay, very gravelly clay loam, very gravelly silt loam.	GM-GC, GC, SC, SM-SC	A-1, A-2, A-4, A-6	10-35	30-70	20-65	20-55	15-45	20-38	3-15
	30-65	Very gravelly silty clay loam, very gravelly clay loam, very gravelly silt loam.	GC, GM, SC, SM	A-2	10-35	20-70	15-65	15-45	12-35	26-42	8-16
CaB---------- Capshaw	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	90-100	85-100	80-95	75-85	18-30	3-10
	6-17	Silty clay loam, silty clay, silt loam.	ML, CL	A-6, A-7	0	90-100	85-100	80-95	75-85	30-45	11-20
	17-52	Clay, silty clay, silty clay loam.	CL, CH, MH	A-7	0	90-100	85-100	80-95	75-90	41-68	18-36
	52-60	Clay, silty clay loam, clay loam.	MH, CH, CL	A-7	0-3	85-100	80-100	75-95	70-90	41-68	18-36
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Cb	0-10	Loam	ML, SM	A-4	0	100	90-100	85-90	40-65	---	NP
Cedarbluff	10-20	Clay loam, loam	CL-ML, ML, CL	A-4	0	100	95-100	95-100	75-90	25-35	5-10
	20-30	Clay loam, loam	CL	A-6	0	100	90-100	70-97	65-85	25-40	11-25
	30-62	Clay loam, loam, clay.	CL, CH	A-6, A-7-6	0	100	85-100	70-100	65-95	25-60	11-35
Ce	0-9	Silt loam	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	60-90	20-35	3-15
Chenneby	9-44	Loam, silt loam, silty clay loam.	CL, ML, MH, CH	A-4, A-6, A-7	0	100	95-100	90-100	75-95	30-55	8-20
	44-60	Stratified sandy loam to silty clay loam.	SM, ML, SC, CL	A-2-4, A-4	0	100	100	65-90	20-75	<30	NP-8
CoB, CoC	0-6	Silt loam	CL-ML, ML, CL	A-4	0	90-100	85-100	75-95	65-85	<30	NP-8
Conasauga	6-13	Silt loam, silty clay loam, clay loam.	CL-ML, CL	A-4, A-6	0	90-100	85-100	75-85	65-80	22-40	4-15
	13-25	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	90-100	85-100	85-95	80-90	41-60	18-35
	25-36	Clay, silty clay	CL, CH, MH	A-7	0	90-100	85-100	85-95	80-90	48-70	23-40
	36-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
CuB, CuC, CuD	0-7	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	95-100	80-97	51-80	20-35	4-12
Cunningham	7-36	Clay, silty clay, clay loam.	CL, CH	A-7-6	0	100	98-100	95-100	75-95	41-65	20-35
	36-58	Weathered bedrock	---	---	---	---	---	---	---	---	---
CxD2	0-5	Silty clay loam	CL, CH, MH, ML	A-6, A-7-5, A-7-6	0	100	95-100	85-100	65-90	30-55	11-24
Cunningham	5-34	Clay, silty clay, clay loam.	CL, CH	A-7-6	0	100	98-100	95-100	75-95	41-65	20-35
	34-56	Weathered bedrock	---	---	---	---	---	---	---	---	---
DaB, DaC	0-7	Silt loam	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	<32	NP-12
Decatur	7-15	Silty clay loam, silty clay, clay.	ML, CL	A-7, A-4, A-6, A-5	0-3	90-100	90-100	88-99	78-92	30-49	8-22
	15-72	Clay	CL, ML, MH, CH	A-7, A-6	0-3	90-100	90-100	88-98	75-90	37-60	11-28
DcC2, DcD2	0-5	Silty clay loam	CL, ML	A-4, A-5, A-6	0-3	90-100	90-100	85-100	75-95	28-43	7-18
Decatur	5-13	Silty clay loam, silty clay, clay.	ML, CL	A-7, A-4, A-6, A-5	0-3	90-100	90-100	88-99	78-92	30-49	8-22
	13-72	Clay	CL, ML, MH, CH	A-7, A-6	0-3	90-100	90-100	88-98	75-90	37-60	11-28
DeB, DeC	0-10	Silt loam	CL-ML, CL	A-4, A-6	0	90-100	80-100	75-95	65-80	24-30	5-11
Dewey	10-28	Clay, silty clay, silty clay loam.	CL	A-6	0	90-100	80-100	75-95	70-85	27-40	12-20
	28-62	Clay, silty clay	CH, CL, MH, ML	A-6, A-7	0-2	85-100	75-100	70-95	65-85	38-68	12-34

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Em Emory	0-10	Silt loam	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	80-95	25-40	4-15
	10-38	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	80-95	25-40	4-15
	38-62	Silty clay loam, silt loam, silty clay.	CL	A-4, A-6, A-7	0-2	90-100	75-100	70-100	65-95	25-45	9-20
Es Ennis	0-9	Gravelly silt loam.	CL-ML, ML, SM, GM	A-4, A-6	0-5	55-85	50-85	40-80	35-70	<30	NP-12
	9-63	Gravelly silt loam, gravelly loam, gravelly clay loam.	ML, SM, GM, CL-ML	A-4, A-6, A-2	0-5	55-95	40-85	40-80	30-70	<35	NP-15
EtB, EtC Etowah	0-8	Loam	ML, CL, SM-SC, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	8-36	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	36-60	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25
FeB, FeC, FeD, FeE Fullerton	0-6	Gravelly silt loam.	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	6-10	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	10-99	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
FrE2 Fullerton	0-6	Gravelly silty clay loam.	CL, ML, SC, GC	A-2, A-6, A-4	2-18	60-90	45-80	40-75	30-70	20-40	3-17
	6-19	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	19-99	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
FuC*: Fullerton	0-6	Gravelly silt loam.	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	6-10	Gravelly silty clay loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	10-99	Gravelly clay, gravelly silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42
Urban land.											
HoB, HoC Holston	0-7	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	7-37	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SM-SC	A-4, A-2	0-5	80-100	75-100	50-100	30-80	21-33	3-10
	37-62	Clay loam, loam, gravelly clay loam.	ML, CL, GC, SC	A-4, A-6, A-7, A-2	0-15	60-100	55-100	50-100	30-80	30-50	7-22

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Ke	0-10	Silty clay loam	ML, MH	A-7, A-6	0	100	95-100	90-100	70-100	38-60	10-24
Ketona	10-76	Silty clay, clay	CL, CH	A-7	0	92-100	91-100	85-100	75-100	40-60	18-34
LeB, LeC	0-6	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	65-90	25-35	5-15
Lyerly	6-20	Clay	CH	A-7-6	0	95-100	90-100	85-100	75-97	50-80	30-60
	20-24	Clay	CH	A-7-6	0	98-100	95-100	85-100	80-100	60-80	40-60
	24-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LrC*:											
Lyerly	0-6	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	65-90	25-35	5-15
	6-20	Clay	CH	A-7-6	0	95-100	90-100	85-100	75-97	50-80	30-60
	20-24	Clay	CH	A-7-6	0	98-100	95-100	85-100	80-100	60-80	40-60
	24-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
LuC*:											
Lyerly	0-6	Silty clay loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	65-90	25-35	5-15
	6-20	Clay	CH	A-7-6	0	95-100	90-100	85-100	75-97	50-80	30-60
	20-24	Clay	CH	A-7-6	0	98-100	95-100	85-100	80-100	60-80	40-60
	24-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
MsC*, MsD*, MsE*:											
Minvale	0-14	Gravelly silt loam.	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	14-48	Gravelly silty clay loam, gravelly silt loam, gravelly loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	48-65	Gravelly silty clay loam, gravelly silty clay, gravelly clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
Shack	0-21	Gravelly silt loam.	SM, SM-SC, ML, GM	A-4	0	55-80	50-75	45-70	36-60	<30	NP-7
	21-40	Gravelly clay loam, gravelly silty clay loam, gravelly loam.	CL, SC, GC	A-6, A-7-6	0-2	60-80	50-80	45-75	40-70	32-45	11-17
	40-60	Gravelly clay loam, gravelly clay.	CL, SC, GC	A-6, A-7-6	0-5	60-80	50-80	45-80	40-75	35-49	15-25
NaC, NaD, NaE	0-8	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4, A-2	0-3	90-100	85-100	55-93	30-60	<30	NP-8
Nauvoo	8-41	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	41-47	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	47-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
NeF---------- Nella	0-12	Stony fine sandy loam, stony loam.	ML, CL, SM, SC	A-4	10-30	90-100	85-90	65-75	36-55	<30	NP-8
	12-41	Stony clay loam, stony sandy clay loam, cobbly clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	0-30	75-95	60-90	45-70	30-60	25-40	6-20
	41-63	Cobbly clay loam, gravelly sandy clay loam, cobbly clay.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
RoA, RoB---------- Rome	0-10	Silt loam--------	ML, CL-ML	A-4	0	98-100	95-100	90-100	70-90	20-35	2-10
	10-42	Loam, clay loam, sandy clay loam.	CL-ML, CL	A-4, A-6	0	99-100	95-100	80-99	55-90	20-40	7-17
	42-60	Clay loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	95-100	90-100	65-99	40-65	20-40	5-15
SmB*:											
Shack----------	0-21	Gravelly silt loam.	SM, SM-SC, ML, GM	A-4	0	55-80	50-75	45-70	36-60	<30	NP-7
	21-40	Gravelly clay loam, gravelly silty clay loam, gravelly loam.	CL, SC, GC	A-6, A-7-6	0-2	60-80	50-80	45-75	40-70	32-45	11-17
	40-60	Gravelly clay loam, gravelly clay.	CL, SC, GC	A-6, A-7-6	0-5	60-80	50-80	45-80	40-75	35-49	15-25
Minvale---------	0-14	Gravelly silt loam.	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	14-48	Gravelly silty clay loam, gravelly silt loam, gravelly loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	48-65	Gravelly silty clay loam, gravelly silty clay, gravelly clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
TaB, TaC---------- Talbott	0-4	Silt loam--------	CL, ML	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	4-37	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	37-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TbC2, TbD2------- Talbott	0-4	Silty clay loam	CL, CH, ML, MH	A-6, A-7	0-5	95-100	90-100	85-95	80-95	35-60	12-32
	4-32	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	32-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
TgG*:											
Tidings	0-6	Gravelly loam	SM, SM-SC, ML, CL-ML	A-4	0	70-95	50-77	45-75	40-70	<30	NP-7
	6-10	Gravelly silt loam, gravelly loam, gravelly silty clay loam.	SC, CL, CL-ML, SM-SC	A-4	0	70-90	50-77	45-75	40-70	<30	4-10
	10-43	Gravelly loam, gravelly silty clay loam, gravelly clay loam.	SC, CL, GC, GM	A-6, A-7-6	0	70-95	50-77	45-75	40-70	30-50	11-21
	43-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Gorgas	0-18	Sandy loam, gravelly loam.	SM, ML, GM, GM-GC	A-4, A-2, A-1-b	0-15	55-100	55-100	45-100	25-65	<30	NP-7
	18-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TmD*, TmF*:											
Tidings	0-8	Gravelly loam	SM, SM-SC, ML, CL-ML	A-4	0	70-95	50-77	45-75	40-70	<30	NP-7
	8-43	Gravelly loam, gravelly silty clay loam, gravelly clay loam.	SC, CL, GC, GM	A-6, A-7-6	0	70-95	50-77	45-75	40-70	30-50	11-21
	43-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Townley	0-6	Loam	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	6-27	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	27-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TnC, TnE, TnF---- Townley	0-6	Silt loam	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	6-27	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	27-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
ToC2, ToE2---- Townley	0-6	Silty clay loam	CL, CH	A-6, A-7	0-2	75-95	65-80	60-80	55-75	30-55	12-30
	6-29	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	29-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TpA, TuA---- Tupelo	0-6	Silt loam	CL-ML, CL, ML	A-4	0	95-100	90-100	80-100	70-90	20-35	3-10
	6-12	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0	95-100	95-100	90-100	85-95	30-55	11-29
	12-51	Clay, silty clay	CH, CL	A-7	0	95-100	95-100	90-100	85-100	41-70	20-42
	51-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
UpF*:											
Udorthents.											
Pits.											
WaA, WaB----------	0-12	Loam----------	SM, SM-SC, ML, CL-ML	A-4	0	95-98	80-97	60-80	45-70	<30	NP-7
Wax	12-34	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	95-98	80-97	65-85	60-75	23-35	6-18
	34-63	Very gravelly clay loam, very gravelly loam, very gravelly sandy clay loam.	GM-GC, SM-SC, GC, SC	A-2-4, A-4, A-1-b	0-5	25-75	15-70	15-55	15-45	20-30	4-10
WhA----------	0-12	Loam----------	ML, CL-ML, CL	A-4	0-3	80-100	75-100	70-100	55-95	18-28	3-10
Whitwell	12-63	Clay loam, loam, silt loam.	CL, CL-ML, ML, SC	A-4, A-6	0-3	80-100	75-100	60-90	40-80	18-35	3-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AnB, AnC, AnD, AnE	0-14	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-3
Allen	14-52	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
	52-99	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.20		
AoC2	0-4	20-35	1.40-1.60	0.6-2.0	0.15-0.18	4.5-5.5	Low	0.20	5	.5-3
Allen	4-52	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
	52-60	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.20		
ApB, ApC	0-11	12-25	1.45-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	3	1-3
Apison	11-37	23-35	1.48-1.62	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.37		
	37-60	---	---	---	---	---	---	---		
ArC	0-5	22-32	1.35-1.45	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28	3	.5-2
Armuchee	5-13	37-47	1.40-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Moderate	0.37		
	13-31	35-45	1.40-1.50	0.2-0.6	0.05-0.10	4.5-5.5	Moderate	0.32		
	31-48	---	---	---	---	---	---	---		
BoE, BoF	0-12	8-20	1.35-1.55	2.0-6.0	0.06-0.11	4.5-5.5	Low	0.28	5	<1
Bodine	12-30	20-35	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
	30-65	23-38	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
CaB	0-6	15-27	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Low	0.37	4	1-3
Capshaw	6-17	25-45	1.35-1.55	0.6-2.0	0.16-0.20	5.1-6.0	Low	0.37		
	17-52	35-55	1.40-1.55	0.06-0.2	0.12-0.18	5.1-6.0	Moderate	0.24		
	52-60	35-50	1.40-1.60	0.06-0.2	0.12-0.16	5.6-7.8	Moderate	0.24		
	60	---	---	---	---	---	---	---		
Cb	0-10	7-22	1.40-1.50	0.6-2.0	0.11-0.15	5.1-6.0	Low	0.28	5	<1
Cedarbluff	10-20	18-35	1.55-1.65	0.6-2.0	0.18-0.20	5.1-5.5	Low	0.32		
	20-30	18-35	1.55-1.65	0.06-0.2	0.12-0.14	5.1-5.5	Moderate	0.32		
	30-62	20-45	1.50-1.65	0.06-0.2	0.12-0.16	5.1-5.5	Moderate	0.32		
Ce	0-9	12-27	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low	0.37	5	.5-3
Chenneby	9-44	12-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.32		
	44-60	8-30	1.30-1.50	0.6-2.0	0.05-0.10	4.5-6.0	Low	0.24		
CoB, CoC	0-6	8-22	1.30-1.60	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.43	2	<1
Conasauga	6-13	17-30	1.20-1.50	0.06-0.2	0.12-0.18	4.5-6.0	Low	0.32		
	13-25	35-60	1.10-1.35	0.06-0.2	0.12-0.18	4.5-6.0	Moderate	0.32		
	25-36	40-60	1.10-1.35	0.06-0.2	0.08-0.15	4.5-6.0	Moderate	0.32		
	36-60	---	---	---	---	---	---	---		
CuB, CuC, CuD	0-7	10-27	1.30-1.60	0.6-2.0	0.15-0.22	3.6-5.5	Low	0.32	3	<1
Cunningham	7-36	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.28		
	36-58	30-60	1.60-1.80	0.06-0.2	0.05-0.08	3.6-5.5	Low	0.24		
CxD2	0-5	27-45	1.25-1.60	0.2-0.6	0.12-0.20	3.6-5.5	Low	0.28	3	<1
Cunningham	5-34	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.28		
	34-56	30-60	1.60-1.80	0.06-0.2	0.05-0.08	3.6-5.5	Low	0.24		
DaB, DaC	0-7	15-27	1.25-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Low	0.32	5	.5-2
Decatur	7-15	35-60	1.20-1.55	0.6-2.0	0.14-0.17	4.5-6.0	Moderate	0.28		
	15-72	35-60	1.20-1.50	0.6-2.0	0.12-0.16	4.5-6.0	Moderate	0.24		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
DcC2, DcD2------- Decatur	0-5 5-13 13-72	27-40 35-60 35-60	1.25-1.55 1.20-1.55 1.20-1.50	0.6-2.0 0.6-2.0 0.6-2.0	0.12-0.17 0.14-0.17 0.12-0.16	4.5-6.0 4.5-6.0 4.5-6.0	Low---------- Moderate----- Moderate-----	0.32 0.28 0.24	5	.5-2
DeB, DeC--------- Dewey	0-10 10-28 28-62	17-27 35-50 45-60	1.35-1.50 1.45-1.55 1.45-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.18-0.20 0.12-0.18 0.12-0.17	4.5-7.3 4.5-6.5 4.5-5.5	Low---------- Moderate----- Moderate-----	0.32 0.24 0.24	5	1-3
Em--------------- Emory	0-10 10-38 38-62	20-35 20-35 32-45	1.20-1.40 1.25-1.45 1.35-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.17-0.21 0.17-0.21 0.16-0.20	5.1-6.0 5.1-6.0 5.1-6.0	Low---------- Low---------- Low----------	0.37 0.37 0.37	5	1-4
Es--------------- Ennis	0-9 9-63	12-25 18-32	1.30-1.45 1.35-1.50	2.0-6.0 2.0-6.0	0.10-0.15 0.08-0.15	4.5-6.0 4.5-6.0	Low---------- Low----------	0.28 0.28	5	1-3
EtB, EtC--------- Etowah	0-8 8-36 36-60	15-27 23-35 32-45	1.30-1.45 1.35-1.50 1.40-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.15-0.20 0.16-0.20 0.16-0.20	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.37 0.32 0.32	5	1-3
FeB, FeC, FeD, FeE------------- Fullerton	0-6 6-10 10-99	15-27 23-35 40-70	1.45-1.55 1.45-1.55 1.45-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.10-0.16 0.10-0.15 0.10-0.14	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Moderate-----	0.28 0.24 0.20	5	.5-2
FrE2------------- Fullerton	0-6 6-19 19-99	27-40 23-35 40-70	1.45-1.55 1.45-1.55 1.45-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.10-0.15 0.10-0.15 0.10-0.14	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Moderate-----	0.24 0.24 0.20	5	<1
FuC*: Fullerton------- Urban land.	0-6 6-10 10-99	15-27 23-35 40-70	1.45-1.55 1.45-1.55 1.45-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.10-0.16 0.10-0.15 0.10-0.14	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Moderate-----	0.28 0.24 0.20	5	.5-2
HoB, HoC--------- Holston	0-7 7-37 37-62	10-25 18-35 20-45	1.35-1.50 1.40-1.55 1.40-1.60	0.6-2.0 0.6-2.0 0.6-2.0	0.15-0.20 0.13-0.20 0.10-0.18	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.28 0.32 0.32	5	.5-2
Ke--------------- Ketona	0-10 10-76	25-50 40-60	--- ---	0.6-2.0 0.06-0.2	0.14-0.20 0.12-0.18	6.1-8.4 6.1-8.4	Moderate----- High----------	0.32 0.32	3	1-4
LeB, LeC--------- Lyerly	0-6 6-20 20-24 24-60	15-35 60-75 50-75 ---	1.20-1.50 1.35-1.55 1.35-1.55 ---	0.2-2.0 <0.06 <0.06 ---	0.16-0.24 0.10-0.16 0.10-0.14 ---	5.1-6.5 5.1-6.5 6.1-7.3 ---	Moderate----- High---------- High---------- ---	0.43 0.32 0.32 ---	2	.5-2
LrC*: Lyerly---------- Rock outcrop.	0-6 6-20 20-24 24-60	15-35 60-75 50-75 ---	1.20-1.50 1.35-1.55 1.35-1.55 ---	0.2-2.0 <0.06 <0.06 ---	0.16-0.24 0.10-0.16 0.10-0.14 ---	5.1-6.5 5.1-6.5 6.1-7.3 ---	Moderate----- High---------- High---------- ---	0.43 0.32 0.32 ---	2	.5-2
LuC*: Lyerly----------	0-6 6-20 20-24 24-60	15-35 60-75 50-75 ---	1.20-1.50 1.35-1.55 1.35-1.55 ---	0.2-2.0 <0.06 <0.06 ---	0.16-0.24 0.10-0.16 0.10-0.14 ---	5.1-6.5 5.1-6.5 6.1-7.3 ---	Moderate----- High---------- High---------- ---	0.43 0.32 0.32 ---	2	.5-2

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
LuC*:										
Urban land.										
MsC*, MsD*, MsE*:										
Minvale	0-14	15-30	1.30-1.45	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.28	5	.5-2
	14-48	20-35	1.40-1.55	0.6-2.0	0.09-0.14	4.5-5.5	Low	0.28		
	48-65	25-45	1.40-1.55	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.28		
Shack	0-21	10-27	1.25-1.50	0.6-2.0	0.10-0.18	4.5-6.0	Low	0.28	3	1-2
	21-40	20-40	1.25-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Low	0.24		
	40-60	35-55	1.25-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
NaC, NaD, NaE	0-8	10-25	1.30-1.60	2.0-6.0	0.13-0.17	4.5-5.5	Low	0.28	3	.5-2
Nauvoo	8-41	18-35	1.30-1.60	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		
	41-47	15-30	1.30-1.60	0.6-2.0	0.11-0.17	4.5-5.5	Low	0.32		
	47-60	---	---	---	---	---				
NeF	0-12	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.15	5	<1
Nella	12-41	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
	41-63	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		
RoA, RoB	0-10	15-25	1.20-1.50	0.6-2.0	0.15-0.22	4.5-5.5	Low	0.28	4	.5-2
Rome	10-42	18-35	1.35-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.24		
	42-60	18-35	1.35-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.24		
SmB*:										
Shack	0-21	10-27	1.25-1.50	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.28	3	1-2
	21-40	20-40	1.25-1.50	0.2-0.6	0.10-0.14	4.5-5.5	Low	0.24		
	40-60	35-55	1.25-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
Minvale	0-14	15-30	1.30-1.45	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.28	5	.5-2
	14-48	20-35	1.40-1.55	0.6-2.0	0.09-0.14	4.5-5.5	Low	0.28		
	48-65	25-45	1.40-1.55	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.28		
TaB, TaC	0-4	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate	0.37	2	.5-2
Talbott	4-37	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-7.8	Moderate	0.24		
	37-60	---	---	---	---	---				
TbC2, TbD2	0-4	32-50	1.35-1.55	0.6-2.0	0.10-0.16	5.1-6.0	Moderate	0.32	2	<1
Talbott	4-32	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-7.8	Moderate	0.24		
	32-60	---	---	---	---	---				
TgG*:										
Tidings	0-6	12-22	1.20-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.28	3	.5-2
	6-10	12-34	1.35-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.24		
	10-43	18-34	1.35-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.24		
	43-60	---	---	---	---	---				
Gorgas	0-18	5-20	1.25-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.17	1	.5-2
	18-60	---	---	---	---	---				
TmD*, TmF*:										
Tidings	0-8	12-22	1.20-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.28	3	.5-2
	8-43	18-34	1.35-1.55	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.24		
	43-60	---	---	---	---	---				
Townley	0-6	10-27	1.30-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low	0.37	2	<1
	6-27	35-60	1.30-1.60	0.06-0.2	0.12-0.18	4.5-5.5	Moderate	0.28		
	27-60	---	---	---	---	---				

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
TnC, TnE, TnF----	0-6	10-27	1.30-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low----------	0.37	2	<1
Townley	6-27	35-60	1.30-1.60	0.06-0.2	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	27-60	---	---	---	---	---	----------	----		
ToC2, ToE2-------	0-6	27-45	1.25-1.60	0.06-0.2	0.12-0.18	4.5-5.5	Moderate-----	0.32	2	<1
Townley	6-29	35-60	1.30-1.60	0.06-0.2	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	29-60	---	---	---	---	---	----------	----		
TpA, TuA---------	0-6	18-27	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Low----------	0.37	4	1-3
Tupelo	6-12	30-45	1.40-1.55	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.32		
	12-51	40-65	1.40-1.55	0.06-0.2	0.12-0.16	5.1-8.4	High---------	0.28		
	51-60	---	---	---	---	---	----------	----		
UpF*:										
Udorthents.										
Pits.										
WaA, WaB---------	0-12	12-27	1.35-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.37	2	1-3
Wax	12-34	20-35	1.40-1.65	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.37		
	34-63	20-35	1.75-1.85	0.06-0.2	0.02-0.05	4.5-5.5	Low----------	0.15		
WhA----------	0-12	10-25	1.35-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.32	5	1-3
Whitwell	12-63	18-32	1.40-1.70	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AnB, AnC, AnD, AnE, AoC2---------- Allen	B	None---------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
ApB, ApC---------- Apison	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
ArC---------- Armuchee	C	None---------	---	---	>6.0	---	---	20-36	Soft	Moderate	Moderate.
BoE, BoF---------- Bodine	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High.
CaB---------- Capshaw	C	None---------	---	---	3.5-5.0	Apparent	Dec-Mar	48-60	Hard	High-----	Moderate.
Cb---------- Cedarbluff	C	Occasional	Brief-----	Nov-Apr	0.5-1.0	Apparent	Nov-Mar	>60	---	High-----	Moderate.
Ce---------- Chenneby	C	Occasional	Very brief to long.	Dec-Apr	1.0-2.5	Apparent	Jan-Mar	>60	---	High-----	Moderate.
CoB, CoC---------- Conasauga	C	None---------	---	---	>6.0	---	---	20-40	Soft	High-----	High.
CuB, CuC, CuD, CxD2---------- Cunningham	C	None---------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
DaB, DaC, DcC2, DcD2---------- Decatur	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
DeB, DeC---------- Dewey	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Em---------- Emory	B	None---------	---	---	5.0-6.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Es Ennis	B	Occasional	Very brief	Dec-Mar	>6.0	---	---	>60	---	Low	Moderate.
EtB, EtC Etowah	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
FeB, FeC, FeD, FeE, FrE2 Fullerton	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
FuC*: Fullerton	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Urban land.											
HoB, HoC Holston	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Ke Ketona	D	Frequent	Brief	Dec-Apr	0.5-1.0	Apparent	Dec-Apr	>60	---	High	Moderate.
LeB, LeC Lyerly	D	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
LrC*: Lyerly	D	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
Rock outcrop.											
LuC*: Lyerly	D	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
Urban land.											
MsC*, MsD*, MsE*: Minvale	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
Shack	B	None	---	---	2.0-4.0	Perched	Jan-Mar	>60	---	Moderate	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
NaC, NaD, NaE----- Nauvoo	B	None--------	---	---	>6.0	---	---	40-60	Soft	Low------	High.
NeF---------- Nella	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
RoA---------- Rome	B	Occasional	Brief-----	Nov-Apr	>6.0	---	---	>60	---	Low------	High.
RoB---------- Rome	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
SmB*:											
Shack----------	B	None--------	---	---	2.0-4.0	Perched	Jan-Mar	>60	---	Moderate	High.
Minvale----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
TaB, TaC, TbC2, TbD2---------- Talbott	C	None--------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
TgG*:											
Tidings----------	B	None--------	---	---	>6.0	---	---	40-60	Hard	Low------	High.
Gorgas----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	Low------	Moderate.
TmD*, TmF*:											
Tidings----------	B	None--------	---	---	>6.0	---	---	40-60	Hard	Low------	High.
Townley----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
TnC, TnE, TnF, ToC2, ToE2------- Townley	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
TpA---------- Tupelo	D	Rare--------	---	---	1.0-2.0	Apparent	Nov-Mar	>60	---	High-----	Moderate.
TuA---------- Tupelo	D	Frequent----	Brief-----	Dec-Apr	1.0-2.0	Apparent	Nov-Mar	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
UpF*:											
Udorthents.											
Pits.											
WaA, WaB----------	C	Occasional	Very brief	Jan-Apr	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	Moderate.
Wax											
WhA----------	C	Occasional	Very brief	Dec-Mar	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
Whitwell											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CHEMICAL TEST DATA FOR SELECTED SOILS

(Data are based on soil material less than 2 millimeters in size. TR means trace. Dashes indicate that analyses were not made)

Soil name, report number, horizon, and depth in inches	Organic carbon	Extractable bases (ammonium acetate)					Cation-exchange capacity			Base saturation		pH	
		Ca	Mg	Na	K	Sum bases	Acidity	Sum of cations	Ammonium acetate	Sum of cations	Ammonium acetate	$CaCl_2$ (1:2)	H_2O (1:1)
	Pct	Milliequivalents per 100 grams of soil								Pct	Pct		
Chenneby*: (S84GA-047-001)													
Ap-----0 to 9	1.11	7.3	0.2	0.1	0.1	7.7	9.4	17.1	13.5	45	57	4.7	5.7
Bw1----9 to 18	0.32	---	---	---	---	---	---	---	---	---	---	4.2	5.3
Bw2---18 to 27	0.20	2.5	0.1	0.1	0.1	2.8	12.6	15.4	12.9	18	22	4.0	5.3
Bw3---27 to 37	0.12	1.1	0.1	TR	0.1	1.3	13.6	14.9	12.8	9	10	3.8	5.3
BC----37 to 60	0.19	---	---	---	---	---	---	---	---	---	---	3.9	5.1
Chenneby**: (S84GA-047-002)													
Ap-----0 to 9	1.12	---	---	---	---	---	---	---	---	---	---	5.3	6.0
Bw1----9 to 22	0.74	5.1	0.6	TR	0.1	5.8	8.0	13.8	10.2	42	57	4.7	5.4
Bw2---22 to 38	0.67	6.0	0.7	TR	0.1	6.8	9.9	16.7	12.4	41	55	4.4	5.3
Bw3---38 to 44	0.42	---	---	---	---	---	---	---	---	---	---	4.7	5.6
BC----44 to 60	0.33	---	---	---	---	---	---	---	---	---	---	5.2	6.1

* 1.7 miles southwest and west on Georgia Highway 146 from the junction with I-75; 100 feet north of Georgia Highway 146; about 400 feet west of bridge and West Chickamauga Creek.

** 0.4 mile south on U.S. Highway 41 from the junction with I-75; 2.0 miles south on Bandy Road; 200 feet east of road and 50 feet north of East Chickamauga Creek.

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS

(Dashes indicate analyses not made)

Soil name, report number, horizon, and depth in inches	Ratio to total clay		Water content*
	Cation-exchange capacity	15 bar water	15 bar
			Pct (wt)
Chenneby**:			
(S84GA-047-001)			
Ap---------- 0 to 9	0.58	0.44	10.3
Bw1---------- 9 to 18	---	4.55	11.5
Bw2---------- 18 to 27	0.47	0.47	13.0
Bw3---------- 27 to 37	0.44	0.47	13.5
BC---------- 37 to 60	---	0.45	19.2
Chenneby***:			
(S84GA-047-002)			
Ap---------- 0 to 9	---	0.51	10.9
Bw1---------- 9 to 22	0.47	0.47	10.2
Bw2---------- 22 to 38	0.51	0.51	12.2
Bw3---------- 38 to 44	---	0.53	10.4
BC---------- 44 to 60	---	0.51	9.5

* Based on soil material less than 2 millimeters in size.

** 1.7 miles southwest and west on Georgia Highway 146 from the junction with I-75; 100 feet north of Georgia Highway 146; about 400 feet west of bridge and West Chickamauga Creek.

*** 0.4 mile south on U.S. Highway 41 from the junction with I-75; 2.0 miles south on Bandy Road; 200 feet east of road and 50 feet north of East Chickamauga Creek.

TABLE 20.--PARTICLE-SIZE ANALYSIS OF SELECTED SOILS
(TR means trace)

Soil name report number, horizon, and depth in inches	Particle-size distribution*										Coarse fractions (mm)**			Percent of whole soil (more than 2 mm in size)
	Total			Silt		Sand					Weight			
	Clay (<.002 mm)	Silt (.002-.05 mm)	Sand (.05-2.0 mm)	Fine (.002-.02 mm)	Coarse (.02-.05 mm)	Very fine (.05-.10 mm)	Fine (.10-.25 mm)	Medium (.25-.50 mm)	Coarse (.50-1.0 mm)	Very coarse (1.0-2.0 mm)	(2.0-5.0)	(5.0-20.0)	(.10-75.0)	
	Pct													
Chenneby***: (S84GA-047-001)														
Ap------ 0 to 9	23.3	59.9	16.6	43.5	16.4	8.2	4.5	1.5	1.3	1.1	2		10	2
Bw1----- 9 to 18	25.3	57.8	16.9	37.9	19.9	8.8	3.2	1.4	1.7	1.8	1		9	1
Bw2---- 18 to 27	27.6	54.9	17.5	35.8	19.1	9.4	3.4	1.1	1.9	1.7	1		9	1
Bw3---- 27 to 37	28.8	54.8	16.4	33.9	20.9	11.3	4.3	0.5	0.3		TR		5	
BC----- 37 to 60	42.8	47.6	9.6	30.6	17.0	6.9	2.4	0.3			TR		3	
Chenneby****: (S84GA-047-002)														
Ap------ 0 to 9	21.5	72.7	5.8	53.9	18.9	3.9	1.0	0.6	0.3		TR	TR	2	
Bw1----- 9 to 22	21.5	74.7	3.8	55.0	19.7	3.2	0.5	0.1			TR		1	
Bw2---- 22 to 38	24.1	60.2	15.7	35.4	24.8	12.6	1.7	0.6	0.5	0.3	1	TR	4	1
Bw3---- 38 to 44	19.5	57.4	23.1	32.8	24.6	14.3	4.6	2.3	1.1	0.8	2	TR	11	2
BC----- 44 to 60	18.7	52.3	29.0	29.0	23.3	17.6	5.5	2.6	1.9	1.4	4	1	16	5

* Based on soil material less than 2 millimeters in size.

** Based on soil material less than 75 millimeters in size.

*** 1.7 miles southwest and west on Georgia Highway 146 from the junction with I-75; 100 feet north of Georgia Highway 146; about 400 feet west of bridge and West Chickamauga Creek.

**** 0.4 mile south on U.S. Highway 41 from the junction with I-75; 2.0 miles south on Bandy Road; 200 feet east of road and 50 feet north of East Chickamauga Creek.

TABLE 21.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Apison	Fine-loamy, siliceous, thermic Typic Hapludults
Armuchee	Clayey, mixed, thermic Ochreptic Hapludults
Bodine	Loamy-skeletal, siliceous, thermic Typic Paleudults
Capshaw	Fine, mixed, thermic Ultic Hapludalfs
Cedarbluff	Fine-loamy, siliceous, thermic Fragiaquic Paleudults
Chenneby	Fine-silty, mixed, thermic Fluvaquentic Dystrochrepts
Conasauga	Fine, mixed, thermic Typic Hapludalfs
Cunningham	Clayey, mixed, thermic Typic Hapludults
Decatur	Clayey, kaolinitic, thermic Rhodic Paleudults
Dewey	Clayey, kaolinitic, thermic Typic Paleudults
Emory	Fine-silty, siliceous, thermic Fluventic Umbric Dystrochrepts
Ennis	Fine-loamy, siliceous, thermic Fluventic Dystrochrepts
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gorgas	Loamy, siliceous, thermic Lithic Hapludults
Holston	Fine-loamy, siliceous, thermic Typic Paleudults
Ketona	Fine, mixed, thermic Vertic Ochraqualfs
Lyerly	Very fine, mixed, thermic Vertic Hapludalfs
Minvale	Fine-loamy, siliceous, thermic Typic Paleudults
Nauvoo	Fine-loamy, siliceous, thermic Typic Hapludults
Nella	Fine-loamy, siliceous, thermic Typic Paleudults
Rome	Fine-loamy, mixed, thermic Typic Hapludults
Shack	Fine-loamy, siliceous, thermic Fragic Paleudults
Talbott	Fine, mixed, thermic Typic Hapludalfs
Tidings	Fine-loamy, mixed, thermic Typic Hapludults
Townley	Clayey, mixed, thermic Typic Hapludults
Tupelo	Fine, mixed, thermic Aquic Hapludalfs
Wax	Fine-loamy, siliceous, thermic Typic Fragiudults
Whitwell	Fine-loamy, siliceous, thermic Aquic Hapludults

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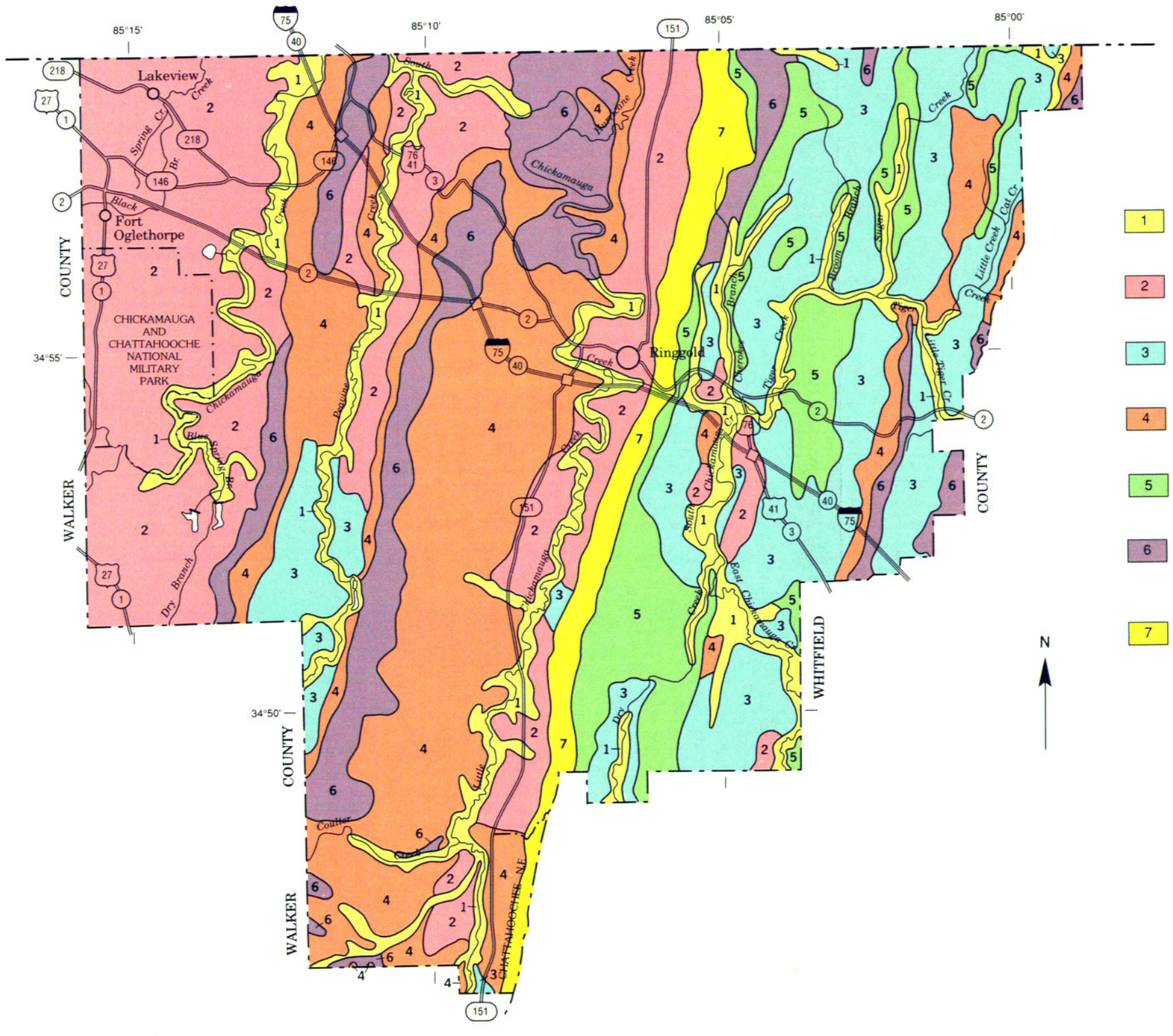
T E N N E S S E E



SOIL LEGEND

1 — CHENNEBY-ROME: Nearly level and very gently sloping, somewhat poorly drained and well drained soils that are loamy throuhout and are 60 or more inches deep over bedrock; on flood plains and stream terraces

2 — LYERLY-TALBOTT: Very gently sloping to strongly sloping, moderately well drained and well drained soils that have a loamy surface layer and a clayey subsoil and are 20 to 40 inches deep over limestone bedrock; on uplands

3 — TOWNLY-CUNNINGHAM-CONASAUGA: Very gently sloping to moderately steep, well drained and moderately well drained soils that have a loamy surface layer and a dominantly clayey subsoil and are 20 to 60 inches deep over shale bedrock; on uplands

4 — MINVALE-FULLERTON: Very gently sloping to strongly sloping, well drained, gravelly soils that have a loamy surface layer and a loamy and clayey subsoil and are 60 or more inches deep over limestone bedrock; on uplands

5 — TOWNLY-TIDINGS: Strongly sloping to steep, well drained soils that have a loamy surface layer and a dominantly clayey subsoil or gravelly soils that are loamy throughout and are 20 to 60 inches deep over shale bedrock; on uplands

6 — MINVALE-BODINE-FULLERTON: Moderately steep to very steep, well drained and somewhat excessively well drained, gravelly and cobbly soils that are loamy throughout or have a loamy surface layer and a dominantly clayey subsoil and that are 60 or more inches deep over limestone bedrock; on uplands

7 — TIDINGS-NELLA: Steep and very steep, well drained, gravelly and stony soils that are loamy throughout and are 40 to more than 60 inches deep over shale or sandstone bedrock; on uplands

* Texture terms refer to the surface layer unless otherwise stated. Texture terms for the subsoil identify the texture of the upper part of the subsoil.

Compiled 1991

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF GEORGIA
COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

GENERAL SOIL MAP

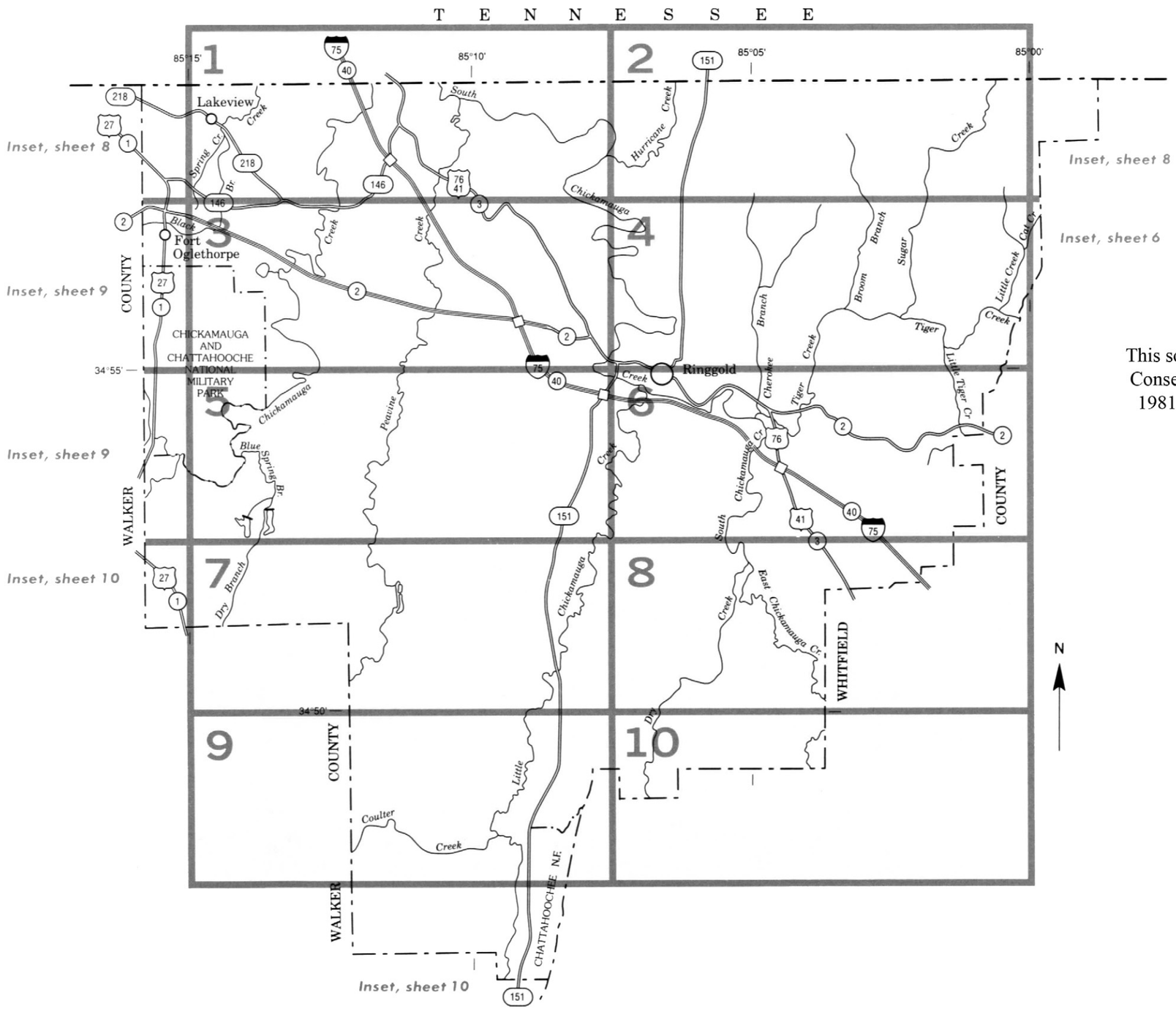
CATOOSA COUNTY, GEORGIA

Scale 1:126,720

1 0 1 2 3 4 Mi

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



Original text from each individual map sheet read:

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1981 – 1983 photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

CATOOSA COUNTY, GEORGIA

Scale 1:126,720

1 0 1 2 3 4 Mi

1 0 3 6 Km

SOIL LEGEND

SYMBOL	NAME
AnB	Allan silt loam, 2 to 6 percent slopes
AnC	Allan silt loam, 6 to 10 percent slopes
AnD	Allan silt loam, 10 to 15 percent slopes
AnE	Allan silt loam, 15 to 25 percent slopes
AoC2	Allan clay loam, 6 to 10 percent slopes, eroded
ApB	Apison loam, 2 to 6 percent slopes
ApC	Apison loam, 6 to 10 percent slopes
ArC	Armuchee channery silt loam, 6 to 10 percent slopes
BoE	Bodine cobbly silt loam, 10 to 25 percent slopes, very stony
BoF	Bodine cobbly silt loam, 25 to 60 percent slopes, very stony
CaB	Capshaw silt loam, 2 to 6 percent slopes
Cb	Cedarbluff loam, occasionally flooded
Ce	Chenneby silt loam, occasionally flooded
CoB	Conasauga silt loam, 1 to 6 percent slopes
CoC	Conasauga silt loam, 6 to 10 percent slopes
CuB	Cunningham silt loam, 2 to 6 percent slopes
CuC	Cunningham silt loam, 6 to 10 percent slopes
CuD	Cunningham silt loam, 10 to 15 percent slopes
CxD2	Cunningham silty clay loam, 6 to 15 percent slopes, eroded
DaB	Decatur silt loam, 2 to 6 percent slopes
DaC	Decatur silt loam, 6 to 10 percent slopes
DcC2	Decatur silty clay loam, 6 to 10 percent slopes, eroded
DcD2	Decatur silty clay loam, 10 to 15 percent slopes, eroded
DeB	Dewey silt loam, 2 to 6 percent slopes
DeC	Dewey silt loam, 6 to 10 percent slopes
Em	Emory silt loam
Es	Ennis gravelly silt loam, 0 to 3 percent slopes, occasionally flooded
EtB	Etowah loam, 2 to 6 percent slopes
EtC	Etowah loam, 6 to 10 percent slopes
FeB	Fullerton gravelly silt loam, 2 to 6 percent slopes
FeC	Fullerton gravelly silt loam, 6 to 10 percent slopes
FeD	Fullerton gravelly silt loam, 10 to 15 percent slopes
FeE	Fullerton gravelly silt loam, 15 to 40 percent slopes
FrE2	Fullerton gravelly silty clay loam, 10 to 25 percent slopes, eroded
FuC	Fullerton-Urban land complex, 2 to 10 percent slopes
HoB	Holston fine sandy loam, 2 to 6 percent slopes
HoC	Holston fine sandy loam, 6 to 10 percent slopes
Ke	Ketona silty clay loam, frequently flooded
LeB	Lyerly silty clay loam, 2 to 6 percent slopes
Lec	Lyerly silty clay loam, 6 to 10 percent slopes
LrC	Lyerly-Rock outcrop complex, 2 to 10 percent slopes
LuC	Lyerly-Urban land complex, 2 to 10 percent slopes
MsC	Minvale-Shack gravelly silt loams, 6 to 10 percent slopes
MsD	Minvale-Shack gravelly silt loam, 10 to 15 percent slopes
MsE	Minvale-Shack gravelly silt loam, 15 to 25 percent slopes
NaC	Nauvoo fine sandy loam, 6 to 10 percent slopes
NaD	Nauvoo fine sandy loam, 10 to 15 percent slopes
NaE	Nauvoo fine sandy loam, 15 to 35 percent slopes
NeF	Nella stony fine sandy loam, 25 to 45 percent slopes, very stony
RoA	Rome silt loam, 0 to 2 percent slopes, occasionally flooded
RoB	Rome silt loam, 2 to 6 percent slopes
SmB	Shack-Minvale gravelly silt loams, 2 to 6 percent slopes
TaB	Talbott silt loam, 2 to 6 percent slopes
TaC	Talbott silt loam, 6 to 10 percent slopes
TbC2	Talbott silty clay loam, 6 to 10 percent slopes, eroded
TbD2	Talbott silty clay loam, 10 to 15 percent slopes, eroded
TgG	Tidings-Gorgas complex, 45 to 70 percent slopes
TmD	Tidings-Townley complex, 10 to 25 percent slopes
TmF	Tidings-Townley complex, 25 to 45 percent slopes
TnC	Townley silt loam, 2 to 10 percent slopes
TnE	Townley silt loam, 10 to 25 percent slopes
TnF	Townley silt loam, 25 to 45 percent slopes
ToC2	Townley silty clay loam, 2 to 10 percent slopes, eroded
ToE2	Townley silty clay loam, 10 to 25 percent slopes, eroded
TpA	Tupelo silt loam, 0 to 2 percent slopes, rarely flooded
TuA	Tupelo silt loam, 0 to 2 percent slopes, frequently flooded
UpF	Udorthents-Pits complex, gently sloping to steep
WaA	Wax loam, 0 to 2 percent slopes, occasionally flooded
WaB	Wax loam, 2 to 6 percent slopes, rarely flooded
WhA	Whitwell loam, 1 to 3 percent slopes, occasionally flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate (173)
- Federal (173)
- State (28)
- County, farm or ranch (1283)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or Small (water)

PITS
- Gravel pit (w)
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban area)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (Gas)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

- SOIL DELINEATIONS AND SYMBOLS (EtC; WhA)
- ESCARPMENTS
  - Bedrock (points down slope)
  - Other than bedrock (points down slope)
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION OR SINK
- SOIL SAMPLE (normally not shown) (S)
- MISCELLANEOUS
  - Blowout
  - Clay spot
  - Gravelly spot
  - Gumbo, slick or scabby spot (sodic)
  - Dumps and other similar non soil areas
  - Prominent hill or peak
  - Rock outcrop (includes sandstone and shale)
  - Saline spot
  - Sandy spot
  - Severely eroded spot
  - Slide or slip (tips point upslope)
  - Stony spot, very stony spot
  - Borrow Area (3 acres or less)

SOIL SURVEY OF CATOOSA COUNTY, GEORGIA — SHEET NUMBER 1

1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000

1 N

1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000

SOIL SURVEY OF CATOOSA COUNTY, GEORGIA — SHEET NUMBER 3

1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000

3

N

N
(Joins sheet 2)
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 6)
SOUTH CHICKAMAUGA CREEK
NORTH CHICKAMAUGA CREEK
CHICKAMAUGA CREEK
Keith Branch
Cherokee Valley
Sand Mountain
WHITEOAK MOUNTAIN
CHEROKEE RIDGE
CHEROKEE VALLEY
UNITED STATES MILITARY RESERVATION
RINGOLD
(county seat)
Salem
Keith
Tiger
WHITFIELD COUNTY
1 MILE
1/2
1/4
0
1 KILOMETER
0.5
SCALE 1:20 000

1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000

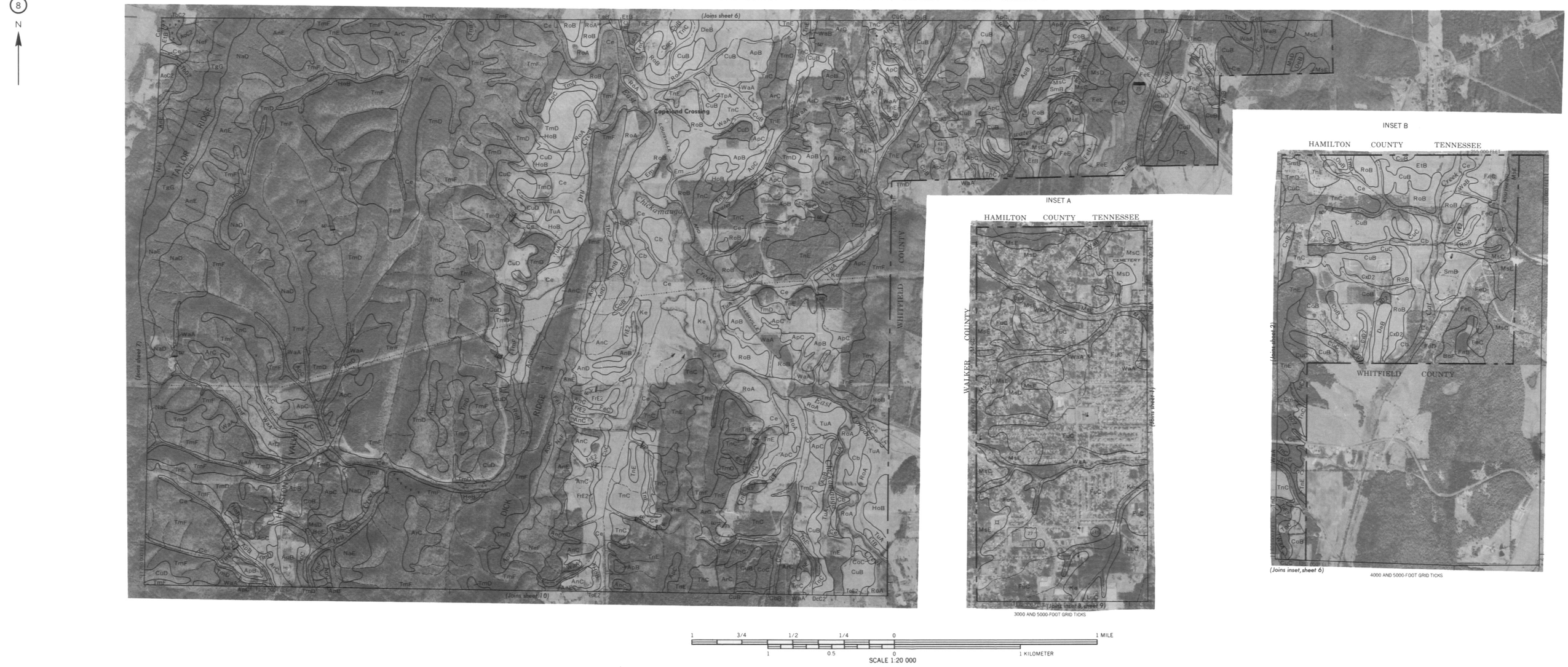
5

N

RINGGOLD
(County seat)
Shookville
Greenwood
Sugartown
Chickamauga Creek
(Joins sheet 4)
(Joins sheet 5)
(Joins sheet 8)
(Joins inset, sheet 8)
WALKER COUNTY
WHITFIELD COUNTY
1000 AND 4000-FOOT GRID TICKS
1 MILE
1 KILOMETER
SCALE 1:20 000

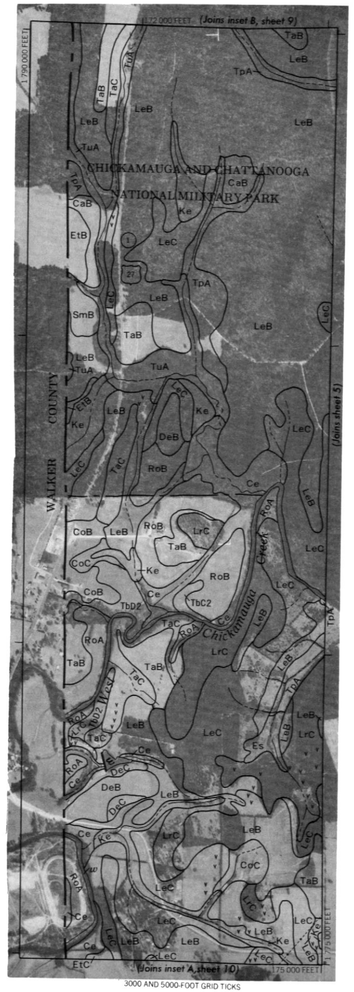
N

WALKER COUNTY
(Joins inset A, sheet 10)
(Joins sheet 5)
(Joins sheet 8)
(Joins sheet 9)
Peavine Ridge
Taylor Ridge
Chickamauga
Pleasant Valley
Beaverdam Branch
Peavine Creek
Beaverdam
Reservoir
1 MILE
1 KILOMETER
SCALE 1:20 000

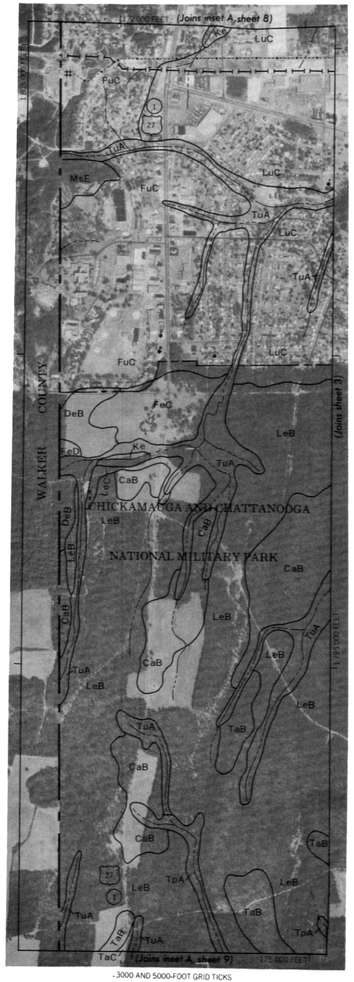

8
N
(Joins sheet 6)
(Joins sheet 7)
(Joins sheet 10)
TAYLOR RIDGE
Copeland Crossing
Chickamauga Creek
WHITFIELD COUNTY
HOUSTON VALLEY
DICK RIDGE
INSET A
HAMILTON COUNTY TENNESSEE
WALKER COUNTY GEORGIA
(Joins sheet 9)
3000 AND 5000-FOOT GRID TICKS
INSET B
HAMILTON COUNTY TENNESSEE
(Joins sheet 2)
WHITFIELD COUNTY
(Joins inset, sheet 6)
4000 AND 5000-FOOT GRID TICKS
1 3/4 1/2 1/4 0 1 MILE
1 0.5 0 1 KILOMETER
SCALE 1:20 000

N

INSET A



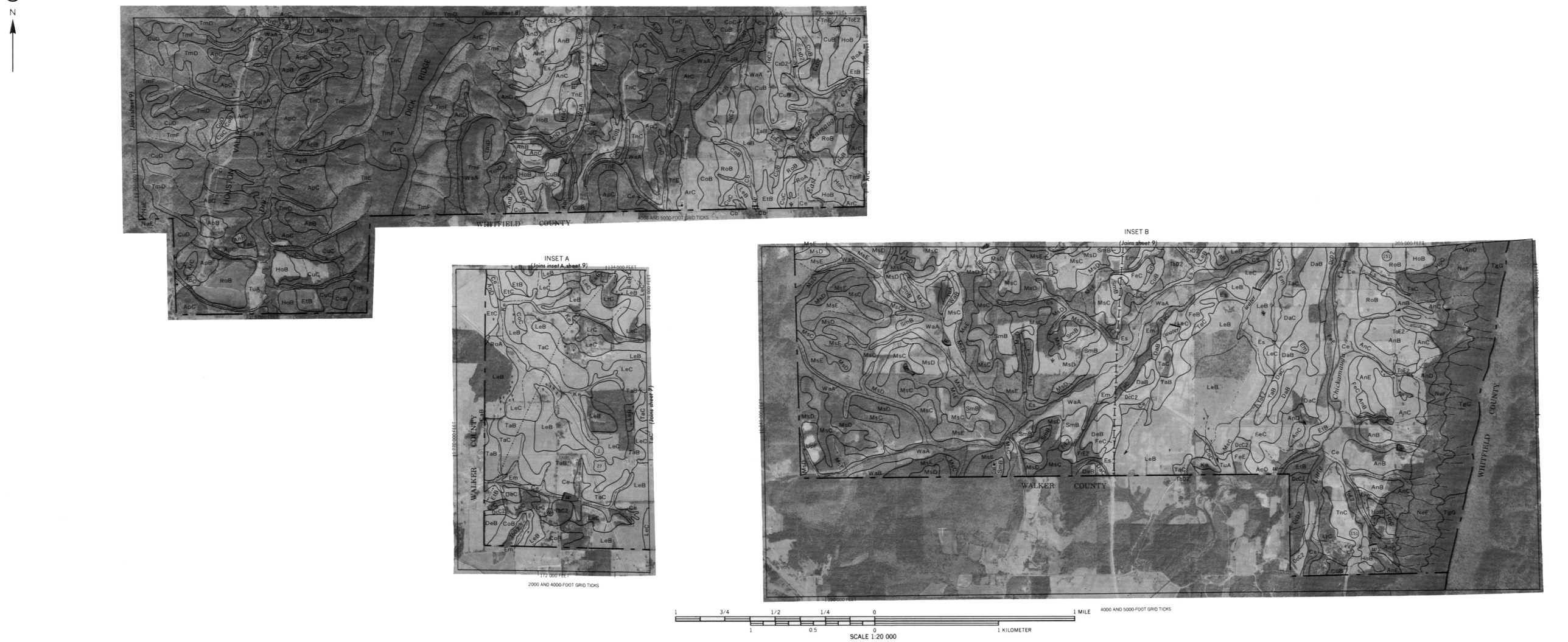
INSET B



1 3/4 1/2 1/4 0 1 MILE

1 0.5 0 1 KILOMETER

SCALE 1:20 000


N
(Joins sheet 8)
(Joins sheet 9)
WHITFIELD COUNTY
HOUSTON VALLEY
DICK RIDGE
Chickamauga Creek
INSET A
(Joins inset A, sheet 9)
WALKER COUNTY
(Joins sheet 7)
INSET B
(Joins sheet 9)
WALKER COUNTY
WHITFIELD COUNTY
Chickamauga Creek
2000 AND 4000-FOOT GRID TICKS
4000 AND 5000-FOOT GRID TICKS
1 MILE
1 KILOMETER
SCALE 1:20 000